PROCEEDINGS OF THE TENTH MEETING

OF THE

ALL-INDIA COUNCIL FOR TECHNICAL EDUCATION

held at

New Delhi on 22nd February, 1957

MINISTRY OF EDUCATION AND SCIENTIFIC RESEARCH
GOVERNMENT OF INDIA

1958

Publication No. 330

PRINTED AT ALBION PRESS, KASHMERE GATE, DELHI-6.

ALL-INDIA COUNCIL FOR TECHNICAL EDUCATION

Minutes of the 10th meeting held on the 22nd February, 1957, at New Delhi.

The 10th meeting of the All-India Council for Technical Education was held in New Delhi on the 22nd February, 1957 at 10.30 A.M. Maulana Abul Kalam Azad, Minister for Education, Government of India presided over the deliberations.

The following were present :—

1.	Shri K.G. Saiyidain	Educational Adviser to the Government of India
Ministries of Government of India		
2.	Shri A.M.S. Rajan	Ministry of Defence
3.	Shri Abdul Qadir	Ministry of Labour
4.	Prof. M.S. Thacker	Ministry of Natural Resources & Scientific Research
5.	Shri S.C. Bhatnagar	Ministry of Finance
6.	Dr. J.C. Ghosh	Planning Commission
Rajya Sabha		
7.	Shri Jaspat Roy Kapoor	Rajya Sabha
State Governments		
8.	Shri C.V.D. Murthy	Government of Andhra Pradesh
9.	Shri R. Prasad (Deputising for Minister for Industries, Bihar)	Government of Bihar
10.	Shri T.N. Tolani	Government of Bombay
11.	Shri A.A. Kazimi	Government of Jammu & Kashmir
12.	Shri A.R. Mudaliar	Government of Kerala
13.	Shri R.P. Naik	Government of Madhya Pradesh
14.	Dr. V.M. Dokras (Adviser)	-do-
15.	Shri R.A. Gopalaswami (Deputising for Minister for Education, Madras)	Government of Madras
16.	Shri H.B. Mohanty	Government of Orissa

17.	Shri G.R.Bhai (Deputising for Minister for Finance & Industries, Punjab)	Government of Punjab
18.	Shri V.G. Garde	Government of Rajasthan
19.	Shri Shri Pat (Deputising for Minister for Industries, Uttar Pradesh)	Government of Uttar Pradesh
20.	Shri D.R. Dhingra, (Adviser)	Government of Uttar Pradesh
21.	Dr. D.M. Sen, (Deputising for Minister for Education, West Bengal)	Government of West Bengal

Industry and Commerce

22.	Shri M.P. Gandhi	Federation of Indian Chambers of Commerce & Industry
23.	Shri B.F. Goodchild	Associated Chambers of Commerce in India

Central Advisory Board of Education

24. Dr. Zakir Husain

Inter-University Board of India

25. Dr. A.L. Mudaliar

Association of Principals of Technical Institutions (India)

26. Shri M. Sen Gupta

University Grants Commission

27. Shri B.D. Laroia
(Deputising for Chairman, University Grants Commission)

Regional Committees

28. Lala Shri Ram

All-India Boards of Technical Studies

29.	Shri S.H. Parelkar	Architecture & Regional Planning
30.	Shri G.K. Chandiramani, Special Officer (Technical Education), Ministry of Education	Secretary

The following were unable to attend :—

Ministries of Government of India

1.	Dr. A. Nagaraja Rao	Ministry of Commerce & Industry

Lok Sabha

2. Shri C.R. Narasimhan

3. Shri Raghunath Singh

State Governments

4. Minister for Education, Assam
5. Minister for Industries, Bihar
6. Ministry for Education, Mysore
7. Ministry for Education, Madras
8. Minister for Finance & Industries, Punjab
9. Minister for Industries, Uttar Pradesh
10. Minister for Education, West Bengal

Industry & Commerce

11. Shri Bharat Ram	Associated Chambers of Commerce of India
12. Shri J.K. Srivastava	All-India Organisation of Industrial Employers
13. Shri Nandas Haridas	-do-
14. Dr. K. Venkataraman	Employers Federation of India
15. Shri G.Y. Mangrulkar	-do-
16. Shri B. Maitra	Federation of Indian Chambers of Commerce & Industry

Labour

17. Shri Michael John	Indian National Trade Union Congress
18. Shri B.K. Nair	-do-
19. Shri A.P. Sharma	National Federation of Indian Railways
20. Shri Anthani Pillai	Hind Mazdoor Sabha

Professional Bodies

21. Shri P.M. Reddy	Institution of Engineers
22. Dr. H.L. Roy	Indian Institute of Chemical Engineers

Nominees of Government of India

23. Shri F.I. Rahimttola
24. Dr. S.R. Sen Gupta

Regional Committees

25. Shri J.J. Ghandy
26. Shri Kasturbhai Lalbhai

All-India Boards of Technical Studies

27. Shri N.K. Mitra	Engineering and Metallurgy
28. Shri D.P. Roy Chowdhury	Applied Art

University Grants Commission

29. Chairman, University Grants Commission.

The Chairman welcomed the members of the Council to the

meeting and reviewed the work done by it since the last meeting. A copy of his speech is appended (Annexure-I).

Agenda for the Meeting (Annexure III)

Item No. 1 :—To report that the minutes of the 9th meeting of the Council were confirmed by circulation

It was reported that the minutes of the 9th meeting held at New Delhi on the 30th October, 1954 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 and to review its constitutions

The Council noted the membership after its reconstitution and considered the question of representation of the reorganised States and Union Territories on it. The Council was of the view that in addition to one representation from each of the reorganised States, there should be some representatives of the six Union Territories also.

Resolved that a recommendation be made to the Government to amend the constitution of the All-India Council for Technical Education so as to provide for three representatives of the Union Territories to be nominated by the Chairman of the Council.

Item No. 3 :—To consider the recommendations of the All-India Boards of Technical Studies

Commerce Board

The Council considered the recommendations of the All-India Board of Technical Studies in Commerce on the question of Reorientation of Commercial Courses in the country.

There was a general feeling that the state of education in Commerce in the Universities is far from satisfactory. It was considered necessary that steps should be taken immediately to improve the state of Commerce education not only in non-university institutions but in the universities as well.

Resolved that a Joint Committee consisting of representatives of the All-India Council for Technical Education, the Inter-University Board, the University Grants Commission, and Industry & Commerce be constituted by the Chairman to examine the question of reorganisation and development of University Commerce Courses and to submit detailed proposals in this behalf.

Regarding the non-university courses, the Council was of the view that there was no need at the present time to send abroad a team of Commerce teachers as proposed by the Board. The Council considered it important that the institutions should be encouraged to

secure the services of persons working in industrial and commercial organisations as part-time teachers for conducting the Commerce courses. Further on the basis of the scheme prepared by the Board, the Regional Committees may formulate detailed proposals.

Resolved that the Regional Committees be requested to frame detailed proposals on the basis of the scheme prepared by the Board of Studies in Commerce to bring about improvement of Commercial education in the States in the institutions which do not conduct University courses.

Board of Chemical Engineering and Chemical Technology

The Council accepted the recommendations of the Chemical Engineering Board for the expansion of training facilities to meet the demand for Chemical engineers anticipated during the next five to seven years.

Resolved (i) that the authorities of the Indian Institute of Technology, Kharagpur and the Harcourt Butler Technological Institute at Kanpur be asked to take steps to increase the intake of students into the Degree courses in Chemical Engineering to 30.

(ii) that the Bihar institute of Technology, Sindri be approved for developing the first Degree course in Chemical Engineering with an annual intake of 30 students, in cooperation with the Sindri Fertilizer Factory.

The Council agreed with the view of the Board that the expansion of facilities as above, will be adequate to meet the anticipated requirements of Chemical Engineers and did not therefore approve the proposals of the Gujarat and the Saugor Universities to start Chemical Engineering degree courses.

The Council suggested that the requirements of Madhya Pradesh State might for the present be met by the Lakshminarayan Institute of Technology, Nagpur and the question of establishing a Chemical Engineering Department in any one of the Engineering Colleges in Madhya Pradesh might be examined later on.

Item No. 4 :—To consider an amendment of the constitution of the Boards

Resolved that the constitution of the Boards of Studies be amended so as to provide for the representation of "Affiliated/Recognised institutions" in place of only "Affiliated institutions" as at present.

Item No. 5 :—To nominate representatives of the Council on the various Boards

Resolved that the following persons be the representatives of

the Council on the various Boards for the term ending 31st December, 1959 :—

Name of Board	*Name of Representative*
1. Commerce	Shri Dhengde, Principal, Sydenham College of Commerce, Bombay.
2. Textile Technology	Shri J.K. Srivastava, Chairman, Board of Directors, New Victoria Mills, Kanpur.
3. Chemical Engineering & Chemical Technology	Dr. J.C. Ghosh
4. Applied Art	Shri D.P. Roy Chowdhury
5. Engineering and Metallurgy	Shri S.R. Sen Gupta
6. Architecture and Regional Planning	Dr. C.M. Master
7. Management	Dr. A. Ramaswami Mudaliar

Item No. 6 :—To consider the recommendations of the Regional Committees of the Councils

The Council noted that the Government had decided to charge 5% interest on loans for the construction of staff quarters repayable in 33 years. The Regional Commitees had examined the matter in great detail and had come to the conclusion that the institutions would not be in a position to repay the loan and interest thereon as also meet the necessary expenses on the maintenance of the quarters built out of the rent collections, if interest was charged at this rate. The Committees had, therefore, recommended that the rate of interest should be kept as low as possible.

The Council was of the view that the provision of this amenity should be considered as part of the development of Technical institutions, since it was an important measure designed to ensure that teachers of the right calibre were attracted to the Technical institutions and continued to remain there. The Council felt that the formula laid down by the Government in respect of the labour housing scheme could be justifiably adopted for this scheme and unless the conditions of loan were revised so as to be in accord with those for the labour housing scheme, the objectives of the scheme would not be fulfilled.

Resolved to recommend to the Government that as in the case of the labour housing scheme, 50% of the cost on staff quarters to be built by Technical institutions be given as grant and the balance of

50% as loan with $4\frac{1}{2}$% per annum interest, repayable in 25 annual instalments.

The Western Regional Committee had recommended that the following institutions namely

(i) L.D. College of Engineering—Ahmedabad,

(ii) Lukdhirjee Engineering College—Morvi and

(iii) Birla Viswakarma Mahavidyalaya—Anand

which had failed to fulfil the conditions prescribed for the increase in intake granted to them be asked to revert to the previous figures of intake. The Council suggested that the Committee might examine what special difficulties were being experienced by the institutes concerned which prevented them from fulfilling the conditions. The Council desired that the matter might be brought up before the Co-ordinating Committee at its next meeting with a full report.

The Council observed that the creation of a joint cadre for Technical institutions and Technical departments of Governments recommended by the Regional Committee to meet the shortage of teachers, would not be practicable since the problem of shortage of teachers existed not only in the Government institutions but also in the non-Government institutions and the requirements of Technical departments and academic spheres differed considerably. The Council. however, strongly recommended the exchange of Technical personnel between teaching institutions and departments of Government and Industry for stated periods.

In regard to the recommendation of the Regional Committee that scholarships and training facilities offered by foreign countries might be utilised for the training of teachers of Technical institutions, the Council observed that the Government had already been doing so, having given a high priority to the problem of training of teachers.

The Council noted that the Coordinating Committe had suggested a membership of preferably 15 but in no case exceeding 20 members for Managing Committees of non-Government Technical institutions. The Western Regional Committee, however, favoured the idea of restricting the membership to 10. The Southern Regional Committee also held this view.

The Council did not consider it advisable that a limit should be prescribed uniformly for all institutions since conditions varied from institution to institution. The Council directed that the respective Regional Committees might examine the cases of individual institutions within the framework of the scheme already approved by the Coordinating Committee.

The Council accepted the recommendation of the Western Regional Committee to grant affiliation to the Govindram Sakseria Technological Institute at Indore.

Resolved that the Govindram Sakseria Technological Institute, Indore be granted affiliation for the National Diploma Course in Civil Engineering. The annual intake be limited to 50 students to this course.

The Council considered a note of Shri Pranlal Patel, a member of the Western Regional Committee on Technical education and training and the question of meeting the requirements of teaching personnel and desired that the Committee might submit concrete schemes in this connection.

The Council generally approved the proposals made by the Southern Regional Committee for the construction of hostels for trainees under the Stipend Scheme viz.:

Training Centre	*Hostel to be constructed for*
Madras	100
Bangalore	50
Bhadravati	15
Coimbatore	25
Alwaye	15
Cochin	15
Lalloguda	15

Before however loans are sanctioned, the Government should ensure that

(a) the centre has sufficient number of trainees to utilise the accommodation built, and

(b) the sponsoring authorities make adequate arrangements for the supervision of hostels in their charge.

The Council approved the proposal for having an attached Polytechnic at the Anantapur Engineering College to provide Diploma courses of the normal pattern in place of the compressed licentiateship courses. In regard to the identical proposal for the future of the compressed licentiate courses offered at the Kakinada Engineering College, the Council observed that an independent State Polytechnic already existed in Kakinada. The Council therefore suggested that the Regional Committee should examine in consultation with the State Government the desirability of further expanding the training facilities of the independent State Polytechnic in Kakinada, so as to take care of the Diploma course seats proposed to be created in the Engineering College in lieu of those provided in the Compressed courses.

The Council approved the recommendation of the Southern Regional Committee, that the second of the two Polytechnics already approved for the Rayalaseema area of Andhra Pradesh might be established in Tirupati.

The Council noted that institutions in Mysore State had all along exceeded their authorised intake, had not cooperated with the Regional Committee and honoured the conditions under which grants were made to them.

The Council requested the Chairman to write to the Chief Minister of the State in this connection. For the maintenance of proper standards, it was important that conditions prescribed in respect of approved schemes of development of Government institutions should be rigidly followed. The State Government might also be requested to expedite their acceptance of development schemes of non-Government institutions as recommended by the Council.

The Council observed that the universities had in certain cases permitted the affiliated colleges to admit a large number of students than that for which facilities were being developed with grants recommended by the Council. The Council felt that this action would adversely affect the standards in such institutions and decided to bring the matter to the notice of the University Grants Commission.

Resolved that the University Grants Commission be requested to address the Universities to enlist their cooperation for the maintenance of proper standards in the Technical colleges affiliated to them by restricting their intake to the numbers fixed by the Council and for which facilities were developed with grants recommended by the Council.

The Council recommended to the Government to examine the possibility of conducting National Diploma Course in Engineering on a part-time basis at the Delhi Polytechnic.

The Council generally approved the proposals made by the Northern Regional Committee for the construction of hostels for trainees under the Stipend Scheme, namely :

Centre	*Number*
Agra	15
Delhi	30
Kanpur	30
Ajmer	15
Phoolbagh	25

The Council recommended the grant of loans to State Governments for the purpose, after a detailed examination of the number of trainees and the arrangements made for supervision of the hostels.

The Council approved the proposal that the H.B. Technological Institute, Kanpur might offer applied Microbiology as one of the electives in the third and fourth years of the basic course in Chemical Engineering. The institute might also conduct a post-graduate course in this subject and short courses of 6-12 months duration in specific aspects of Applied Microbiology for M.Sc. in Chemistry, Botany or Zoology.

The Council noted with regret that funds sanctioned for the National Certificate Courses at the Guru Nanak Engineering College had been diverted by the authorities of the College for other purposes. The Council recommended that no further financial assistance might be given to the institute until the funds so diverted were made available for the approved development.

Item No. 7 :—To receive a note on the Schemes included in the Second Five-Year Plan

The Council recorded the report after noting the following changes in the Statements :—

(a) Serial No. 3 under Plan provision for Central Schemes of Scientific and Technical Education should read "Establishment of three Higher Technological Institutes and the development of the Indian Institute of Science, Bangalore"

(b) The statement showing the number of new institutions provided for in the Plan of the State Governments should be amended as follows:—

Engineering Colleges	
Andhra Pradesh	1 instead of nil
Assam	1 instead of 2
Polytechnics	
Assam	1 instead of nil
Bombay	5 instead of 6
Jammu & Kashmir	1 instead of nil
Total	22 instead of 21
Junior Technical Schools	
Assam	1 instead of nil
Bombay	2 instead of nil
Total	61 instead of 58

The representative of Orissa State stated that the State Government had made provision for two Polytechnics in their Plan. The Secretary of the Council was asked to check on this and make the necessary amendment in the Statement.

The question of the setting up of the Northern and the Southern Higher Technological Institutes was raised. In this connection, it was

suggested that the Regional Committees might be empowered to take further action to bring about the establishment of the Institutes expeditiously. It was pointed out that the Council and the Regional Committees were advisory bodies and had no executive functions. As such, the Ministry of Education would take all necessary action in this behalf.

Item No. 8 :—To receive a report on the action taken on the recommendations of the Engineering Personnel Committee

The Council appoved the report of Ghosh-Chandrakant Committee on the implementation of the recommendations of the Engineering Personnel Committee and recommended that the proposed expansion of institutions might be taken up immediately. Immediate steps should also be taken on the recommendations concerning Teachers' training.

The Council noted that the State Government of Bombay had now included the establishment of a new Engineering College at Nagpur in its revised Second Five-Year Plan. The proposal concerning this institution in the Ghosh-Chandrakant report might, therefore, be dropped.

Some of the members expressed the view that the salary scales of teachers would require to be raised above the level proposed in the Ghosh-Chandrakant report. It was recognised that if for the present the salary scales could be raised as proposed, it would improve the situation. The Council, therefore, suggested that pending a full examination of the question by the Special Committee already appointed by the Coordinating Committee for the purpose, the scales might be improved as proposed in the Ghosh-Chandrakant report.

Item No. 9 :—To consider proposals for development recommended by the various Committees of the Council

The Council considered the recommendation of the Eastern Regional Committee made at its 11th meeting held on the 9th November, 1956, to implement the Scheme prepared by the Engineering Board for the training of Technicians for Refrigerations industry, at the Bengal Engineering College, Sibpur on a full-time basis and at the Calcutta Technical School on a part-time basis. The Council did not consider it desirable that the Bengal Engineering College should make this provision in view of the additional responsibilities devolving on the College in connection with the expansion proposed under the Engineering Personnel Committee Scheme.

Resolved to recommend that the Calcutta Technical School be approved for implementing the scheme for training of Refrigeration Mechanics at a cost of Rs. 3,72,500 Non-recurring at Rs. 41,400 recurr-

ing to be shared between the Central and State Governments in the usual proportions, with the proviso that the implementation of the scheme should commence after the Board of Technical Studies reported on the details of the training course.

The Council considered the recommendations of the Western Regional Committee made at its 10th & 11th Meetings held on the 10th October, 1956 and the 13th February, 1957 respectively.

Resolved to recommend that an additional Non-recurring expenditure of Rs. 2,500/- might be incurred by the Government Training Institute Khar for the purchase of equipment, to be shared in the usual manner between the Central and State Governments.

Resolved to recommend that nine Non-University institutions in the region be developed at a total cost of development of Rs. 1,44,63,350 Non-recurring and Rs. 3 lakhs recurring subject to (i) the normal financial scrutiny by the Central Government (ii) the conditions suggested by the Regional Committee in respect of each institute and (iii) the development cost being shared between the Central Government and State Governments in agreed proportions.

DEVELOPMENT COST

Institution	Class of Institute	Building & furniture	Equipment	Total	Recurring	Loan
1	2	3	4	5	6	7
Bombay						
1. Victoria Jubilee Technical Institute, Bombay * ...	Non-Govt.	9,25,000	11,21,850	20,46,850	...	3,60,000
2. Sir Cusrow Wadia Institute of Elect. Technology, Poona	,,	1,43,000	2,02,000	3,45,000	...	1,69,000
3. Government Polytechnic, Sholapur	Govt.	10,42,000	8,54,000	18,96,000	3,00,000	5,06,200
4. Sir Bhavsinghji Polytechnic Institute, Bhavnagar ...	,,	79,300	5,63,000	6,42,000	...	1,92,000
5. Engineering College, Nagpur ** ...	,,	16,38,000	15,20,000	31,58,000	...	4,23,000
Madhya Pradesh						
1. Govindram Todi—Govt. Polytechnic, Jaora ...	,,	7,96,000	6,72,000	14,68,000	...	5,10,000
2. Polytechnic, Bhilsa *** ...	Non-Govt.	4,70,000	4,00,000	8,70,000	...	2,63,000
3. Engineering College, Gwalior **** ...	,,	15,79,000	16,20,000	31,99,000	...	4,92,000
4. Sardar Vallabhai Polytechnic, Institute Bhopal ...	Govt.	3,27,500	5,11,000	8,38,500	...	7,00,000

* This development should be integrated with the expansion of the institute under the Engineering Personnel Committee Scheme.

** The State Governments plan provision of Rs. 24.35 lakhs for this purpose should be raised to Rs. 31.58 lakhs the full cost of the scheme.

*** To be treated as part of the Engineering Personnel Committee Scheme.

**** Subject to the donation promised by the Ganga Jali Trust, being made available by the Trust.

The Council decided to forward to the University Grants Commission the recommendations of the Regional Committee for an additional expenditure of Rs. 35,100 to the M.S. University, Baroda to provide for increase in cost of some items of equipment already approved.

The Council considered the recommendations of the Southern Regional Committee made at its 4th meeting held on 10th August, 1956 and 5th meeting held on 21st November, 1956.

Resolved to recommend that three non-university institutions in the Region be developed at a total cost of Rs. 15,00,000 non-recurring and Rs. 1,40,000 recurring subject to

i) Normal financial scrutiny of the Central Government

ii) the conditions suggested by the Regional Committee in respect of each institute

iii) the development cost being shared between the Central and State Governments in agreed proportions.

DEVELOPMENT COST

Institution	Class of Institution	Building and furniture	Equipment	Total	Recurring	Loan for Hostels
1	2	3	4	5	6	7
Andhra Pradesh						
1. Govt. Tech. College, Hyderabad	Government	—	—	—	—	4,00,000
Kerala						
1. Alagappa Nagar Polytechnic, Alagappa Nagar	Non-Government	1,33,000	4,93,000	6,26,000	60,000	—
Madras						
1. Polytechnic—Chettinad	,,	4,92,000	3,82,000	8,74,000	80,000	—

The Council decided to forward the recommendations concerning three university institutions in the region to the University Grants Commission (amounts shown being the total additional cost of development):—

1	2	3	4	5	6	7
1. Engineering College, Andhra University, Waltair	Non-Government	15,20,000	15,20,000	30,40,000	3,60,000	10,00,000
2. J.V.D. College of Science & Technology, Andhra University, Waltair	,,	6,68,500	4,54,300	11,22,800	61,000	2,10,000
3. Additional grants to Department of Chemical Engineering—A.C. College of Technology—Madras University	,,	—	12,500	12,500	600	—

Resolved to recommend that loans totalling Rs. 20.4 lakhs might be granted to the following institutions for the construction of staff quarters on terms and conditions recommended under item No. 6 :—

NON-UNIVERSITY INSTITUTIONS

Andhra Pradesh

1. College of Engineering, Anantapur ... 3.5 lakhs.
2. Government Engineering College, Kakinada ... 1.4 ,,

Kerala

1. Government Polytechnic, Kalamasery ... 1.5 ,,

Madras

1. Seshasayee Institute of Technology, Tiruchirapalli 1.7 ,,
2. P.S.G. College, Coimbatore ... ... 2.0 ,,
3. Government Engineering College, Guindy ... 3.39 ,,

UNIVERSITY INSTITUTIONS

1. Engineering College, Annamalai University 3.66 ,,
2. A.C. College of Technology, Madras ... 3.25 ,,

The Council observed that the proposals for the establishment of new Engineering colleges and Polytechnics in the Southern Region had been formulated with a view to fulfilling the requirements as assessed by the Engineering Personnel Committee for the Second Five-Year Plan and the possible requirements in the third plan. Since a comprehensive scheme for fulfilling the recommendations of the Engineering Personnel Committee had been separately approved, the proposals put forward by the Regional Committee might be considered on the basis indicated in the following resolution :—

Resolved that the establishment of new institutions should be decided on the basis of the criteria as follows :—

I. State Government Institutions :

Only those institutions for which the State Governments have made the necessary provision in their respective Five-Year Plans may be proceeded with.

II. Private Institutions :

Only those private agencies which fulfil the following conditions may be assisted in the establishment of new institutions :—

(i) The private agencies by themselves or in association with the State Governments concerned should meet at least 50% of the approved non-recurring cost the balance being met

from the grants to be given by Central Government. Wherever the State Governments make a contribution that amount should be provided in its Five-Year Plan.

(ii) The private agencies should have adequate resources including income from tuition fees to meet at least 50% of the approved recurring expenditure. The balance should be provided by the State Government and the Central Government in agreed proportions, subject to the condition that the State Government shall assume the entire responsibility after the current plan period.

The Council considered the recommendations made by the Northern Regional Committee at its 3rd meeting held on 28th December, 1956.

Resolved to recommend that 12 non-University institutions in the region be developed at a total cost of Rs. 77,26,208 non-recurring and Rs. 2,27,310 recurring subject to :

(i) normal financial scrutiny of the Central Government,

(ii) the conditions proposed by the Regional Committee in respect of each institution, and

(iii) the development cost being shared between the Central Government and the State Government in agreed proportions.

DEVELOPMENT COST

Institution	Class of institution	Building & furniture	Equipment	Total	Recurring	Loan for Hostels
1. Nilokheri Polytechnic, Nilokheri	Government	2,80,000	5,34,391	8,15,293	2,07,310	11,25,000
2. Technical College Dayalbagh, Agra	Non-Govt.	2,28,000	4,28,200	6,56,200	—	—
3. P.M.V. Engineering College, Mathura	,,	60,000	1,57,000	2,17,000	—	—
4. Hewitt Engineering School, Lucknow	,,	2,57,280	4,01,650	6,58,930	—	—
5. Civil Engineering School, Lucknow	,,	3,60,700	3,87,150	7,47,850	—	—
6. Government Technical Institute, Gorakpur	Government	3,46,000	3,93,700	7,39,700	—	—
7. Government Technical Institute, Lucknow	,,	2,81,200	4,42,550	7,23,750	—	—
8. I.D. Technical Institute, Bahjoi	Non-Govt.	2,46,360	4,24,500	6,70,860	—	—
9. Guru Nanak Engineering College, Ludhiana	,,	1,96,400	2,86,100	4,82,500	—	—
10. National Institute of Engg., Hoshiarpur	,,	2,70,000	2,61,700	5,31,700	—	—
11. Government Technical Institute, Ambala	Government	3,23,000	2,62,575	5,85,575	—	—
12. Viswakarma Polytechnic, Phagwara	Non-Govt.	3,85,700	5,11,150	8,96,850	--	—

The Council decided to forward to the University Grants Commission the recommendation for additional expenditure of Rs. 14,500 for the Engineering College, Aligarh Muslim University for the purchase of equipment.

The Council considered the recommendations of the Southern and the Western Regional Committees for the construction of Assembly Halls in the various institutions and decided to recommend that such construction work be deferred in view of the difficult supply position of building materials.

Item No. 10 :—To review the Demarcation of Regions and the Constitution and functions of the Regional Committees

The Council decided that the proposals for demarcation of the country into five Regions for the purpose of development of Technical education may be deferred until the Zonal Councils had been set up and had started functioning. On the question of constitution of the Regional Committees the Council decided as follows :—

Resolved (i) that the Union Territories be given representation on the Regional Committees; one representative of each of the Union Territories might be nominated on the appropriate Regional Committee by the Administrative Head of the Territory ;

(ii) that the representation given to the Ministry of Labour—D.G.R.E. should be changed to that for the Ministry of Labour—National Council for Training in Vocational Trades;

(iii) that the Association of Principals of Technical Institutions be given one seat on each of the Regional Committees immediately, in addition to the four seats already available to the Universities and Technical institutions.

In regard to the functions of the Regional Committees the Council resolved as follows :—

Resolved that in addition to the existing functions, the Regional Committees also assess the standards and recognise examinations conducted by institutions/organisations for the purpose of endorsement of their awards as National Certificate/Diploma.

The demarcation of the Regions on reorganisation of States the constitution and the functions as revised above are given in Annexure-II

Item No. 11 :—To receive a note on the establishment of State Boards of Technical Education

The Report on the Establishment of State Boards of Technical Education was recorded. It was noted that most States had either set up the Boards or taken a decision to that effect. The Secretary was asked to take up the matter with the remaining States.

Item No. 12 :—To review the question of affiliation of institutions to the Council for National Diploma and Certificate Courses

The Council decided that it should cease to affiliate institutions and hold examinations as and when the State Boards or other suitable Organisations in each State are found to be in a position to take over these responsibilities.

Item No. 13 :—To consider the Scheme of Training in Foremanship and Supervision

The Council approved the scheme for National Certificate Course in Foremanship and Supervision prepared by the All-India Board of Technical Studies in Management and accepted the recommendation of the Board that the scheme be implemented in consultation with Industrial concerns, Government Departments and Technical institutions.

Resolved that the Regional Committees be requested to make detailed proposals for introducing the scheme of Training for National Certificate in Foremanship and Supervision including the names of the centres when such courses may be organised.

Item No. 14 :—To consider the recommendations of the Expert Committee on the Scheme for Sandwich Course for National Certificate in Mechanical Engineering

The Council considered the recommendations of its expert committee for preparing a scheme of Sandwich courses leading to National Certificate in Mechanical Engineering and agreed that it would serve the useful purpose of training technicians for the industry. While approving the scheme, the Council desired that care should be taken to see that the participating industries were such that they were in a position to provide systematic training in their workshops.

Resolved that the Regional Committees be requested to make specific and detailed proposals for the implementation of the scheme of Sandwich Courses leading to National Certificate in Mechanical Engineering.

Item No. 15 :—To consider the Report of the Joint Committee of the All-India Council for Technical Education & University Grants Commission on the development of teaching facilities for Geology and Applied Geology

The Council decided to defer consideration of this item in view of the fact that the Joint Committee was reconsidering the matter and would submit its final report shortly.

Item No. 16 :—To consider the suggestions of the Government of Madhya Pradesh regarding replacement of English as medium of instruction in Technical institutions

The Council decided to defer consideration of the question of medium of instruction in Technical institutions until the reports of the Languages Commission and of the Kunzru Committee appointed by the University Grants Commission were available.

Item No. 17 :—To consider the application of Rangaswamy Naidu Educational Trust Engineering College for Financial Assistance

The Council considered the various causes, as stated by the Government of Madras, that led to the establishment of this College without prior approval and suggested that Central Government might take certain steps to avoid such procedural lapses in future.

Resolved to recommend to the Central Government (i) that an official notification be published in the Gazette of India informing all concerned that the Central Government assistance will only be available where the prior approval of the Council has been obtained to the establishment of Technical institutions ;

(ii) that the co-option of the State Governments may be sought in the matter.

Resolved further to recommend that the Government may assist the Rangaswamy Naidu Trust Engineering College provided the institution satisfies the conditions proposed under Item No. 9—Southern Regional Committee—in connection with the establishment of new institutions.

Item No. 18 :—To consider the question of starting Diploma Courses in Electrical and Mechanical Engineering at the Ramakrishna Mission Vidyalaya, Coimbatore

The Council expressed the view that institutions selected for development under the Rural Higher Education Scheme should confine themselves to the activities contemplated under that scheme. The proposal of the Ramakrishna Mission Vidyalaya to start National Certificate Courses of the Council in Electrical and Mechanical Engineering was not approved,

Item No. 19 :—To Consider the question of starting Degree courses in Guru Nanak Engineering, College Ludhiana

Resolved that Guru Nanak Engineering College, Ludhiana be approved for starting the Degree courses in Engineering and for financial assistance on that account subject to the following conditions :—

a) That the institution will make good the funds granted to it for the National Certificate Course and which have been wrongfully used for other purposes.

b) That the institution satisfied the conditions proposed under item No. 9—Southern Regional Committee in connection with the establishment of new institutions.

Item No. 20 :—To report the establishment of National Council for training in Vocational Trades and appoint a representative on that body

The report was recorded.

Resolved that Shri G. Y. Mangrulkar, Staff Training Officer, Tata Iron and Steel Co. Ltd. be nominated as the representative of the Council on the National Council for training in Vocational Trades.

Item No. 21 :—To consider the question of pedagogical training for Technical teachers of Multipurpose schools and also the organisation of Workshops as an emergency measure

The Council decided to appoint an Expert Committee consisting of the following to suggest the contents, duration and other details of a pedagogical course for the teachers of Multipurpose schools which might be organised in selected Technical institutions :—

Shri J. A. Taraporevala, Chairman.

A Principal of an Engineering College.

A Principal of a Polytechnic.

Principal of the Institute for the Training of Instructors, Koni, Bilaspur.

Two experts nominatd by the Council for Secondary Education.

Item No. 22 : —To consider the requirements for Staff, maintenance expenses etc. for an Engineering institution offering first degree or equivalent courses in Civil, Electrical and Mechanical Engineering

Resolved that the estimates made by the Engineering Board for staff, maintenance expenditure etc. for institutions conducting first degree or equivalent courses in Civil, Mechanical and Electrical Engineering be used as guide in assessing the requirements of such institutions.

Item No. 23 :—To consider the proposal for reorganisation and expansion of the Indian School of Mines and Applied Geology, Dhanbad

The Council considered the recommendations of the Expert Committee on Mining regarding the reorganisation scheme of the Indian School of Mines and Applied Geology, Dhanbad and agreed that the institute should be developed as proposed for training in undergraduate, post graduate and research work in Mining, Geology and associated subjects.

Resolved to recommend to the Central Government that the Indian School of Mines and Applied Geology, Dhanbad be developed as recommended by the Expert Committee subject to the modification that instead of a Senior Professor and a Professor for Mechanical and Electrical Engineering only one post of professor in either of the two scales be included in the staff requirements.

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

ANNEXURE I

Speech delivered by

MAULANA ABUL KALAM AZAD

Minister for Education & Scientific Research and Chairman of the All-India Council for Technical Education on the occasion of the 10th Meeting of the All-India Council for Technical Education held on the 22nd February, 1957, New Delhi.

Friends,

I have great pleasure in welcoming you to the 10th meeting of the All-India Council for Technical Education.

There are many questions deserving our notice which are included in the agenda before us. I will not deal with them at this stage but take them up at the appropriate time and will now content myself by drawing your attention only to some basic issues.

You are aware that while great progress has been made in all fields of education since the attainment of independence, perhaps the most remarkable advance has been in that of Technical education. During the five years ending in 1955, the annual output of degree holders has been almost doubled and the intake increased by more than 50 per cent. Equally marked progress is seen in the annual output and intake at the diploma level.

The Council rightly recognised that the future of Technical education in the country would depend on the improvement of institutions at the under-graduate level. The Regional Committees of the Council carried out an assessment of the requirements of 93 institutions. Schemes involving a total expenditure of approximately Rs. 7.5 crores non-recurring have been recommended for their improvement. In addition, two crores of rupees have been approved for schemes involving interest-free loans to provide additional hostel accommodation for about 7,000 students.

Along with the strengthening and improvement of under-

graduate education, considerable progress has also been made in the development of post-graduate courses and advanced work in research. You are aware of the remarkable development of the Indian Institute of Technology, Kharagpur, and of the Indian Institute of Science, Bangalore. In all, schemes for the introduction of post-graduate courses in 30 subjects at 15 selected institutions have been approved. In the field of Specialised Studies, four Regional Printing Schools were sanctioned of which three are already functioning. A Central School of Town and Regional Planning has been set up and the Administrative Staff College is expected to start its first course in September 1957.

In the Second Five-Year Plan, the programme for the development of Technical education has been further strengthened. As against a total provision of Rs. 23 crores in the First Five-Year Plan, the Second Plan provides an amount of almost Rs. 50 crores. Three Higher Technological Institutes on the lines of the Kharagpur Institute will be set up during this period and many new Engineering Colleges and Polytechnics established. It is proposed to increase the annual output of Engineering graduates from 3,000 to 5,000 and provide for a corresponding increase in the number of Diploma-holders. The Engineering Personnel Committee appointed by the Planning Commission considers even these increases inadequate and has recommended that additional provision be made for the establishment of 18 Engineering Colleges and 62 Polytechnics. The Committee has also recommended that training capacity in the existing institutions should be increased by 20% at the degree level and by 25% at the diploma level.

During the First Five-Year Plan efforts at improvement were concentrated mainly on adding to the physical facilities in the country. Buildings and equipments of existing institutions were improved and new institutions established. Although such improvements are very necessary, they cannot by themselves produce well-trained Engineers. The crux of the problem is to have teachers of the right calibre and students of the requisite ability. It is recognised that educational institutions cannot compete with industry in the matter of salaries. Concrete measures must however be taken to attract brilliant young men to the educational career and to provide conditions which will enable the institutions to retain the services of such men. Along with such measures to recruit and retain teachers of the requisite calibre, steps must be taken for increasing the pool of scholarships available to students for Technical courses. Only in this way can we ensure that a sufficient number of brilliant young students will be

attracted to a Technical career. Fellowships should also be created in colleges and awarded to promising men who may be apprenticed to professors and other senior teachers for stated periods. I need hardly say how important it is to maintain proper standards in Technical institutions, for unless this is done none of our targets in the economic or the industrial sphere can be fulfilled.

Before concluding I would like to deal with two criticisms which are often made about our Engineering and Technical personnel. The first complaint is that instruction in the colleges is highly academic and the personnel turned out is not immediately useful to industry. I would point out that the practice of production techniques can be had only in the industry. Technical institutions cannot be expected to give it, nor should they attempt it. The criticism of academic bias can however be largely corrected by the introduction of Sandwich courses and providing larger opportunities of practical training. It would also help if High school leavers are taken as apprentices and put through a supervised course of practical training along with theoretical instruction in Technical institutions.

The other criticism is about the shortage of Engineers and Technologists at the higher level. The chief reason for such shortage is that employers do not provide a graduate student with adequate opportunities for training after graduation. In most cases even graduates are used for unimportant routine tasks which could well be performed by persons with lower qualifications. The result is frustration in the young graduate and shortage of trained personnel at higher levels. We must provide facilities to Engineering and Technological graduates for pursuing higher studies and create for this purpose a sufficient number of scholarship at a level which will be attractive. It would also pay empolyers to get young graduates to go through the various departments as part of their training and during this period assume only minor responsibilities. In this way they gain in confidence and acquire experience which will later enable them to serve the various processes of industry as a unified whole. I would appeal to industry to cooperate with educational institutions in carrying out both these measures. On behalf of the Government, I can say that the Government will welcome any steps industry may take to make such cooperation effective.

I would now request you to proceed to the consideration of the various items on the agenda.

ANNEXURE II

Regional Committees of the All-India Council for Technical Education—Demarcation of regions, composition and functions of the Committees:

(A) **Demarcation of Regions** :—

Northern Region

States :—Punjab, Uttar-Pradesh, Rajasthan and Jammu & Kashmir.
Union Territories :—Delhi and Himachal Pradesh.

Eastern Region

States :—Assam, West Bengal, Bihar, Orissa.
Union Territories :—Manipur, Tripura and Andaman Nicobar Islands.

Western Region

States :—Bombay and Madhya Pradesh.

Southern Region

States :—Madras, Andhra, Mysore and Kerala.
Union Territories :—Laccadive, Minicoy, and Aminidevi Islands.

(B) **Composition** :—

Ministry of Education	—	One representative
Ministry of Labour	—	-do-
(National Council for training in Vocational Trades)	—	-do-
Ministry of Railways	—	-do-
States	—	One representative from each State

		(Northern Region —6 Eastern Region —7 Western Region —2 Southern Region —5)
Eminent persons connected with Industry, Commerce and Labour	—	Three (to be nominated by the Chairman of the Council)
Association of Principals of Technical institutions	—	One representative
Technical institutions and Universities having Technological Departments	—	Four representatives (to be nominated by the Chairman of the Council)
Institution of Engineers (India)	—	One representative
All-India Council for Technical Education	—	One representative (to be elected from amongst non-official members of the Region)
By cooption (if considered necessary)	—	Two members

The Regional Officers of the Ministry of Education & Scientific Research to act as Secretaries to the Committees.

(C) **Functions :—**

i) To survey the facilities for Technical education in all stages and to make recommendations to the Coordinating Committee/Council on the development of Technical education, including establishment of new institutions, wherever necessary ;

ii) To make preliminary examination of any institutions seeking recognition and to make recommendations to the Coordinating Committee ;

iii) To tender advice and guidance to Technical institutions within the region, affiliated to the Council and/or in receipt of financial aid or funds from the Central Governmentas well as to such other institutions as may seek the same ;

iv) To promote liaison between Technical institutions and Industry and other Technical Establishments ;

v) To assist the States and Technical institutions in securing practical training facilities ;

vi) To appoint Boards of Examiners, taking into consideration the recommendations of the Boards of Technical Studies concerned and to arrange for the proper conduct

of examinations ;

vii) To publish the results of the examinations ;

viii) To send reports to the Coordinating Committee about the conduct of examinations periodically ;

ix) To consider and make recommendations on such other matters as may be referred to it by the Coordinating Committee/Council ; and

x) To assess the standards and recognise examinations conducted by institutions/organisations for the purpose of endorsement of their awards as National Certificate/ Diploma.

ANNEXURE III

All-India Council for Technical Education, 10th Meeting

Date : 22nd February, 1957.
Time : 10-30 A.M.

Place : Commission Room 'G'
Vigyan Bhavan,
King Edward Road,
New Delhi.

AGENDA

1. To report that the minutes of the 9th meeting of the Council were confirmed by circulation.
2. To report the membership of the reconstituted Council and to review its constitution.
3. To consider the recommendations of the All-India Boards of Technical Studies.
4. To consider an amendment of the constitution of the Boards.
5. To nominate representatives of the Council on the various Boards.
6. To consider the recommendations of the Regional Committees of the Council.
7. To receive a note on the Schemes included in the Second Five-Year Plan.
8. To receive a report on the action taken on the recommendations of the Engineering Personnel Committees.
9. To consider proposals for development recommended by the various Committees of the Council.
10. To review the demarcation of regions and the constitutions and functions of the Regional Committee.
11. To receive a note on the Establishment of State Boards of Technical Education.
12. To review the question of affiliation of Institutions to the Council for National Diploma and Certificate Courses.
13. To consider the scheme of training in Foremanship and Supervision.
14. To consider the recommendations of the Expert Committee on the Scheme for 'Sandwich' Course for National Certificate in Mechanical Engineering.

15. To consider the report of Joint Committee of the All-India Council for Technical Education and the University Grants Commission on the development of teaching facilities for Geology and Applied Geology.
16. To consider the suggestions of the Government of Madhya Pradesh regarding replacement of English as medium of instruction in Technical institutions.
17. To consider the application of Rangaswami Naidu Educational Trust Engineering College for financial assistance.
18. To consider the question of starting Diploma courses in Electrical and Mechanical Engineering at the Ramakrishna Mission Vidyalaya, Coimbatore.
19. To consider the question of starting Degree courses in the Guru Nanak Engineering College, Ludhiana.
20. To report the establishment of National Council for Training in Vocational Trades and appoint a representative on that body.
21. To consider the question of pedagogical training for Technical teachers of Multipurpose schools and also the organisation of workshops as an emergency measure.
22. To consider the requirements for Staff, maintenance expenses etc. for an Engineering institution offering first degree or equivalent courses in Civil, Electrical & Mechanical Engineering.
23. To consider the proposal for reorganisation and expansion of the Indian School of Mines and Applied Geology, Dhanbad.
24. Any other business.

Item No. 2 :—To report the membership of the reconstituted Council and review its constitution

The membership of the Council as reconstituted in April, 1955 is given at Annexure-I.

2. The clause (h) of the constitution of the Council given at Annexure-II provides for one representative of each of the Part 'A' and 'B' States. In accordance with this clause 14 reorganised States are represented on the Council. It is for consideration if six Union Territories may also be given similar representation on the Council. In case it is decided to give such representation to the Union Territories, the nomination of representatives may be made by the Administration's Head of the respective Territory.

ANNEXURE I

All-India Council for Technical Education (Reconstituted)

LIST OF MEMBERS

(a) Chairman (Ex-officio)	1. Maulana Abul Kalam Azad, Minister for Education, Central Government.
(b) Educational Adviser to the Government of India (Ex-officio)	2. Shri K.G. Saiyidain, Secretary, Ministry of Education, New Delhi.
(c) Chairman of the Regional Committee of the Council (Ex-officio)	
Eastern Regional Committee	3. Shri J. J. Ghandy, Director, Tata Iron & Steel Co., Jamshedpur.
Western Regional Committee	4. Shri Kasturbhai Lalbhai, Pankora Naka, Ahmedabad.
Northern Regional Committee	5. Lala Shri Ram, 22, Curzon Road, New Delhi.
Southern Regional Committee	6. Dr. A. L. Mudaliar, Vice-Chancellor, Madras University, Madras.
(d) Chairman of the All-India Boards of Technical Studies (Ex-officio)	
Commerce	7. Shri M. P. Gandhi, C/o Gandhi & Co., Jan Mansion, Pherozeshah Mehta Road, Bombay.
Textile Technology	8. Lala Shri Ram, 22, Curzon Road, New Delhi.
Engineering & Metallurgy	9. Shri N. K. Mitra, 16, Hindustan Road, Rashbehari Avenue, Calcutta.

Architecture & Regional Planning	10.	Shri S. H. Parelkar, Medows House, Medows Street, Fort,Bombay.
Chemical Engineering & Chemical Technology	11.	Dr. J. C. Ghosh, Member, Planning Commission, New Delhi.
Applied Art	12.	Shri D. P. Roy Chowdhury, Principal, Govt. School of Arts and Crafts, Madras.
Management	13.	Shri J. J. Ghandy, Director, Tata Iron & Steel Co., Jamshedpur.
(e) Representatives of Ministries of Government of India		
Commerce & Industries	14.	Dr. A. Nagaraja Rao, Chief Industrial Adviser, Development Wing, Ministry of C & I, New Delhi.
Defence	15.	Secretary, Ministry of Defence or his representative.
Finance	16.	Secretary, Ministry of Finance or his representative,
Labour	17.	Shri Abdul Qadir, I.A.S., Director General of Resettlement & Employment New Delhi. (2, Wellsely Road, New Delhi.)
N.R. & S.R.	18.	Prof. M. S. Thacker, Director, C.S.R., Old Mill Road, N. Delhi.
Planning Commission	19.	Dr. J.C. Ghosh, Member, Planning Commission New Delhi.
(f) Lok Sabha	20.	Shri C.R. Narasimhan M.P., 60 Bazulullah Road, Thyagarayangar.
	21.	Shri Raghunath Singh M.P. D/55/197, Ghechatta, Banaras City.
(g) Rajya Sabha	22.	Shri Jaspat Roy Kapoor, Sheetla Gali, Agra.

(h) State Governments

Andhra Pradesh	23.	Shri C.V.D. Murthy, Joint Director of Public Instruction (Tech. Education), Andhra, Hyderabad.
Assam	24.	Minister for Education, Assam, Shillong.
Bihar	25.	Minister for Industries, Bihar, Patna.
Bombay	26.	Shri T.N. Tolani, Director of Technical Education, Bombay.
Madhya Pradesh	27.	Shri R.P. Naik, Secretary, Education Department, Madhya Pradesh, Bhopal.
Madras	28.	Minister for Education, Madras.
Orissa	29.	Dr. H.B. Mohanty, Additional Secretary, Development Deptt., Govt. of Orissa, Cuttack.
Punjab	30.	Minister for Finance and Industries, Punjab, Chandigarh.
Uttar Pradesh	31.	Minister for Industries, U.P., Lucknow.
West Bengal	32.	Minister for Education, West Bengal, Calcutta.
Jammu & Kashmir	33.	Shri A. Kazimi, Director of Education, Jammu & Kashmir, Srinagar.
Mysore	34.	Minister for Education, Mysore.
Rajasthan	35.	Shri V.G. Garde, Principal, Engineering College, Jodhpur.
Kerala	36.	Dr. A. Ramaswami Mudaliar, Vice-Chancellor, University of Travancore, Trivandrum.

(i) Industry & Commerce

Associated Chambers of Commerce of India	37.	Shri B.F. Goodchild, C/o M/S Saxby & Farmer India Ltd., 17, Convent Road, Entally. Calcutta.

	38.	Shri Bharat Ram, C/o The Delhi Cloth & General Mills Co., Delhi.
All-India Organisation of Industrial Employers	39.	Shri J.K. Srivastava, Chairman, Board of Director, New Victoria Mills Co. Ltd., Kanpur.
	40.	Shri Nandas Haridas, C/o Vijaya Mills Co. Ltd., Naroda Road, Post Railwaypura, Ahmedabad.
Employers Federation of India	41.	Dr. K. Venkataraman, Director, Deptt. of Chemical Technology, Bombay University, Matunga, Bombay.
	42.	Shri G.V. Mangrulkar, Staff Training Officer, Tata Iron & Steel Co., Jamshedpur.
Federation of Indian Chambers of Commerce & Industry	43.	Shri B. Maitra, Calcutta Chemical Co., Ltd., 35, Panditia Road, Calcutta-29.
	44.	Prof. M.P. Gandhi, Jan Mansion, Sir Pherozeshah, Mehta Road, Fort, Bombay.
(j) Labour		
Indian National Trade Union Congress	45	Shri Michael John, 17, K. Road, Jamshedpur.
	46.	Shri B.K. Nair, Indian National Trade Union Congress Office, Murdakayam (Travancore-Cochin State).
National Federation of Indian Railwaymen	47.	Shri A.P. Sharma, 97, European Colony, Moghalsarai (Eastern Rly).
Hind Mazdoor Sabha	48.	Mr. Anthani Pillai, 8, Ramchandra Road, Madras.
(k) Central Advisory Board of Education	49.	Dr. Zakir Husain, Vice-Chancellor, Muslim University, Aligarh.
(l) Inter-University Board of India	50.	Dr. A.L. Mudaliar, Vice-Chancellor, Madras University, Madras.

(m) A.P.T.A. (India)	51.	Shri M. Sen Gupta, Engineering College, Banaras Hindu University, Banaras.
(n) Professional Bodies Institution of Engineers	52.	Shri P.M. Reddy, High Cliffs, Begampet, Hyderabad (Deccan).
Indian Institute of Chemical Engineers	53.	Dr. H.L. Roy, Chemical Engineering Deptt. College of Engineering & Technology, Jadavpur, Calcutta-32.
(o) Nominees of Government of India	54.	Mr. F.I. Rahimtoola, Ismail Building, Hornby Road, Fort, Bombay.
	55.	Dr. S.R. Sen Gupta, Director, Indian Institute of Technology, Kharagpur.
(p) University Grants Commission (Ex-officio)	56.	Chairman, University Grants Commission.

ANNEXURE II

All-India Council for Technical Education

CONSTITUTION

(i) *Members* :—

(a) Chairman—The Hon'ble Minister for Education, Central Government.

(On occasions when he is unable to preside over a meeting of the Council, the Educational Adviser to the Government of India will deputise for him.)

(b) Educational Adviser to the Government of India.

(c) Chairman of the Regional Committees of the Council (Ex-Officio)

(d) Chairman of the All-India Boards of Technical Studies (Ex-Officio).

(e) Representatives of the Ministries and Departments of the Government of India.

(f) Two members of the House of the People elected by it.

(g) One member of the Council of States elected by it.

(h) One representative of each of the Part (A) and Part (B) States.

(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 the organisations approved by the Government of India.

(k) One member of the Central Advisory Board of India.

(l) One member of the Inter-University Board of Education.

(m) One representative of the Association of Principals of Technical Institutions in India.

(n) Two representatives of Professional Bodies.

(o) Not more than two members nominated by the Government of India to represent other interests.

(p) Chairman, University Grants Commission.

(ii) *Term of Office* :—The term of office of all non-official members who were first elected or nominated to the Council shall be three years reckoned from the first day of the first meeting of the

Council, namely, the 30th April, 1946, and the term of office of all non-official members subsequently elected or nominated shall be three years reckoned from the appropriate anniversary of the day ; provided that a member elected or nominated under sub-clauses (f) (g) (k) & (l) above shall cease to be a member of the Council if he ceases to be a member of the House of the People, the Council of States, the Central Advisory Board of Education or the Inter-University Board of India as the case may be. The Official members of the Council will continue until they are replaced by others. All casual vacancies among the members (other than ex-officio members) shall be filled by the authority or body who nominated or elected the members whose place becomes vacant, and the person appointed to a casual vacancy shall be a member of the Council for the residue of the term for which the person whose place he fills would have been a member.

Item No. 3 :—To consider the recommendations of the All-India Boards of Technical Studies

All-India Board of Technical Studies in Commerce

The All-India Board of Technical Studies in Commerce held its 11th meeting on the 27th December, 1956. The Board considered the report of the Sub-Committee on the Re-orientation of Commercial Education in the country. Some of the important observations. The Report of the Sub-Committee and the syllabuses prepared by it are given at Appendix 'A'*. Recommendations in the Report are as follows :—

(i) English should continue to be the medium of instruction for a decade or so.

(ii) Teachers in Commerce institutions should be given adequate opportunities for first hand contact with business methods and practices in the country and for advanced training abroad.

(iii) Most of the Commerce institutions are poorly equipped. The Committee has prepared a list of equipment to serve as a model for all Commerce colleges. Commerce institutions should be given adequate financial grants either by the State Government concerned or the Central Government to bring the standards of training up to date

(iv) A team of experienced teachers having practical knowledge of requirements of trade, Commerce and Industry should be sent on a study tour abroad.

The Board expressed its general agreement and recommended that the scheme prepared by the Committee might be adopted.

2. The Board considered the question of changes necessary in admission qualifications etc. as a result of the new pattern of Secondary education and expressed the view that since for some time to come both Matriculates and those who had passed Higher Secondary Examination would be available for admission to the National Diploma course in Commerce, it would not be desirable to change the duration of the course. The Board, however, recommended that the candidates who had passed the Higher Secondary Examination with Commerce as their elective subject, might be admitted to the second year of the full-time National Diploma course in Commerce.

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

All-India Board of Technical Studies in Chemical Engineering & Chemical Technology

The All-India Board of Technical Studies in Chemical Engineering & Technology held its 10th meeting on the 18th February, 1957. The Board recognised the need for expanding the facilities for the first Degree course in Chemical Engineering in consideration of the demand for Technical personnel in the current as well as in the third Five-Year Plan period. The Board recommended that the Degree course in Chemical Engineering should conform to the general pattern designed by the Board and all the institutions where the admission capacity is less than 30 at present should be increased to 30 so that part of the desired expansion of training facilities might be brought about with speed, economy and efficiency. The institutions concerned are Harcourt Butler Technology Institute, Kanpur and Indian Institute of Technology, Kharagpur. For this expansion, the institutions should provide the necessary instructional facilities. The Board also recommended that as Sindri was an important centre of chemical industry and as no facilities in Chemical Engineering were available anywhere in Bihar a Department of Chemical Engineering be established in the Bihar Institute of Technology, Sindri for the first Degree course in Chemical Engineering with an admission capacity of 30 students per year. The Institute should establish cooperative relationship with the Sindri Factory which would facilitate the participation of the experts of the factory in conducting the course in the practical training of the students in the industry.

The Board considered the proposal of (i) Gujarat University (ii) Saugar University for starting Degree courses in Chemical Engineering and expressed the view that with the expansion of training facilities as indicated above, the total provision of seats for Chemical Engineering course in the country would be of the order of 460 which would meet the present and anticipated requirements over the next 5-7 years. Further, Chemical Engineering course is best organised in an existing and well-developed Engineering college, which condition, however, is not satisfied in the case of Gujarat and Saugar Universities. The Board, therefore, recommended that the proposals of these Universities may not be accepted at this stage.

The Board also recommended that in view of the States reorganisation and the consequential lack of Chemical Engineering training facilities in the new Madhya Pradesh State, the Lakhminarayan Institute of Technology, Nagpur may reserve a few seats for the students of that State. The question of establishing a Chemical Engineering Department in any of the well-developed Engineering colleges in Madhya Pradesh may be examined at a later stage when the Chemical industry develops on a large scale and the demand for Technical personnel exceeds the present estimates.

Item No. 4 :—To consider an amendment of the constitution of the Boards

The constitution of the All-India Boards provides for one representative of the "Affiliated institutions" on Board. The question of affiliation of institutions to the All-India Council for Technical Education is being reviewed by the Council (vide *Item No. 12*). If it is decided to discontinue the affiliation of institutions and transfer the work of examinations to the State Boards of Technical Education, no institutions will be affiliated to the Council in future. In any case, in accordance with the policy laid down by the Council, there will be provision in the future for "recognising" institutions, examinations of which will make the students eligible for National conferments. In the circumstances it is suggested that the constitution be amended so as to provide for the representation of, "Affiliated/Recognised institutions" in place of only "Affiliated institutions."

Item No. 5 :—To nominate representatives of the Council on the All-India Boards of Technical Studies

The term of office of the members of the All-India Boards of

Technical Studies expired on the 31st December, 1956, and the Boards are being reconstituted for a further period of three years commencing from the 1st January, 1957.

The constitution of the Boards provides for nomination of one representative of the Council on each Board. The previous representatives of the Council on the various Boards were as follows :

	Name of the Board	*Name of representative*
1.	All-India Board of Technical Studies in Commerce	Prof. M.P. Gandhi.
2.	All-India Board of Technical Studies in Textile Technology	Late Shri P.N. Joshi.
3.	All-India Board of Technical Studies in Chemical Engineering & Chemical Technology	Dr. J.C. Ghosh.
4.	All-India Board of Technical Studies in Applied Art	Shri D.P. Roy Chowdhury.
5.	All-India Board of Technical Studies in Engineering & Metallurgy	Dr. S.R. Sen Gupta.
6.	All-India Board of Technical Studies in Architecture & Regional Planning	Shri C.M. Master. (He is not a member of the Council now).
7.	All-India Board of Technical Studies in Management	Mr. T.G. May The Gen. Elec. Co. (India) Ltd., Calcutta. (He is not a member of the Council now).

The Council may now nominate its representatives on the Boards.

Item No. 6 :—To consider the recommendations of the Regional Committees of the Council

Since the last meeting of the Coordinating Committee of the Council, the following meetings of the Regional Committees were held :—

A. Eastern Regional Committee — 1 Meeting
(11th Meeting held on 9th November, 1956)

B. Western Regional Committee — 1 Meeting
(10th Meeting held on 10th October, 1956)

C. Southern Regional Committee 2 Meetings.
(4th Meeting held on 10th August, 1956
5th Meeting held on 21st November, 1956)

D. Northern Regional Committee 2 Meetings.
(2nd Meeting held on 21st July, 1956
3rd Meeting held on 28th December, 1956)

Specific proposals for the development of institutions made by the Regional Committees are submitted to the Council under Item No. 9 of the Agenda. Other recommendations regarding the approval of the Council are given below :—

Western Regional Committee

1. The Council may pursuade the Government of India to charge an interest of not more than 3% on loans for the construction of staff quarters, as it felt that anything in excess might render the scheme unworkable thereby depriving the institutions of the advantages resulting from residence of teachers in the near vicinity of institutions.

(It may be stated in this connection that the Government has decided to charge 5% as interest on such loans).

2. The institutions noted below have already increased the annual intake of admissions to various courses as per previous recommendation of the Coordinating Committee but have failed to fulfil the conditions prescribed for the said increase.

(i) L.D. College of Engineering, Ahmedabad.
(ii) Lukdhirjee Engineering College, Morvi.
(iii) Birla Vishwakarma Mahavidyalaya, Anand.

In case the prescribed conditions are not fulfilled by the institutions concerned, by June 1957, they may be directed to revert to their original figures of admission.

3. To meet the shortage of teachers in Engineering institutions, a joint cadre of Technical personnel for teaching institutions as well as other Government Departments (viz., Public Works Department, Electricity Board etc.) which will enable exchange of Technical personnel from executive to teaching posts and vice versa, may be created by the State Governments.

Foreign assistance, offered to this country in the form of scholarships may be utilised for the training of young men with an academic bent, under contract to work in teaching institutions for a minimum period of five years on return to this country after completion of their training.

4. The strength of the Managing Committees of Non-Government institutions should not exceed 10 including nominees of different organisations. This recommendation has arisen out of the report made of the Regional Committee that the Coordinating Committee favoured a Managing Committee of not more than 20 in any case but preferably consisting of 15 persons.

The 11th meeting of the Western Regional Committee was held on 13th February, 1957, specific proposals for development of institutions are submitted as addendum to item No. 9 of the agenda. The following recommendations other than development are placed below for approval of the Council.

1. Govindram Seksaria Technological Institute, Indore, may be affiliated to the All-India Council for Technical Education for the National Diploma course in Civil Engineering for 50 students subject to the Institution appointing more qualified teachers in the Department of Applied Mechanics.
2. Shri Pranlal Patel, member Western Regional Committee submitted proposals (the author's introductory notes on these proposals are given in the annexure) on the following subjects :—
   (a) Technical training and education covering all grades of Technical personnel in basic trades.
   (b) Teaching personnel—to overcome our immediate and future requirements. The Regional Committee endorsed these proposals and submitted them for the consideration of the Council. The Committee also decided to depute the author of the proposals to present the view point of industry on the subject at the Council Meeting.

Southern Regional Committee

1. Every centre of practical training having more than 10 trainees should be provided with a students' hostel. Hostels may be constructed in the Southern Region as under :—

Training Centre	*No. of persons for whom hostel accommodation is to be provided*
Madras	100
Bangalore.....	50
Bhadravati...	15

Coimbatore.....	25
Alwaye.....	15
Cochin.....	15
Lalloguda.....	15

2. The total number of members on the Managing Committees of Non-Government Technical Institutions should be only 10. Half this number should be from the Trust or General Body and the other half should be representatives of State Government, Central Government, Regional Committee, Universities of the area and Technical experts from industry. Non-Government Technical institutions in the region may be asked to implement the revised suggestion. (Please refer to recommendation No. 4 of the Western Regional Committee in this connection).

3. The compressed licentiate courses at Kakinada and Anantapur Engineering Colleges may be converted into Civil, Mechanical and Electrical Engineering Diploma courses of the approved pattern and offered at the Polytechnics attached to the respective institutions. The requirements of the institutions for this purpose may be assessed on the basis of the expert Committee's report on this subject already accepted by the Regional Committee and transmitted to the Coordinating Committee for approval.

4. The Coordinating Committee in its 21st meeting held on 9th June, 1955 approved two additional Polytechnics for the Rayalaseema area of the then Andhra State and has also recommended grants for this purpose. One of these was already established at Visakhapatnam with the approval of the Regional Committee. The second Polytechnic may be located at Tirupati.

The Regional Committee noted that the institutions in Mysore State which have all along exceeded their authorised intake figures continue to do so and have also failed to participate in the special sub-committee arranged for survey of additional requirements of institutions. So the Regional Committee resolved to request the Government of India through the All-India Council for Technical Education that the State institutions which do not cooperate with the Regional Committee and do not adhere to the conditions laid down in respect of grants already sanctioned, to withhold further assistance to them because the standards of the Southern region as a whole in the production of Engineering personnel is bound to go down by the production of Technical personnel by such institutions.

Northern Regional Committee

1. A part time course leading to the National Diploma in

Engineering may be provided at the Delhi Polytechnic, for students who have passed the National Certificate Examination.

2. Hostels for trainees under the Practical Training Stripend Scheme may be provided at Agra, Delhi, Kanpur, Ajmer and Phoolbagh (Tarai Farm) and that such hostels should be constructed and managed by the State Governments concerned. Interest free loans may be provided by the Government of India for this purpose.

3. The Government of India should be requested to utilise the German Government offer of assistance in the establishment of the Northern Higher Technological Institute at Kanpur.

4. The Government may give the entire amount required for the construction of staff quarters as loan and charge 2% per annum as interest, or alternatively 25% of the amount may be sanctioned as grant and the remaining 75% as loan at interest of 3½% per annum,

5. Applied Microbiology may be offered as one of the electives in the third and fourth year of the basic course in Chemical Engineering. A Post-graduate course in this subject for a limited number of Chemical Engineering students and short courses of 6-12 months' duration in specific aspects of Applied Microbiology for M.Sc.s in Chemistry, Botany or Zoology, may also be conducted at the H.B. Technological Institute Kanpur if there be demand.

6. The Guru Nanak Engineering College, Ludhiana, with the permission of the University of Punjab had started Degree classes in Civil Engineering, without obtaining the approval of the All-India Council for Technical Education or the Northern Regional Committee. The College had done so in contravention of the conditions, subject to which developmental grants have been sanctioned for providing National Certificate course only. As the matter is of all-India nature, the Coordinating Committee should formulate a policy for consideration of applications for financial help, in such cases.

Pending consideration of matter by the Coordinating Committee/ Council, the Committee, however, decided that the grants already paid to the institution should not be utilised for purposes other than the one, for which it was made and the College should carry out the schemes for which the grant was made.

ANNEXURE

Introductory note by Shri Pranlal Patel on his proposals

(a) *Technical training and education covering all grades of Technical personnel in basic trades*

It is observed, during the last few months, that considerable amount of interest has been awakened in the country for Technical training and education schemes.

There are several suggestions coming from various quarters and often contradictory. In our over-enthusiasm for the expansion of Higher Technical education we are neglecting the real basis upon which such a super-structure can be efficiently constructed.

The vocational training for operatives (semiskilled and skilled) and foremen forms a sound basis for our country's Technical manpower. In the absence of such a definite training programme and facilities provided, there is considerable amount of manpower wastage in the country in the age group of 14—17 years.

Very soon we shall have compulsory Primary education which shall bring further problems as to what should be done with these youngsters for their future careers.

With the industrial expansion in the present Second Five-Year Plan and the subsequent Plans to follow there will be considerable expansion in the requirements of trained personnel, the stortage of which has already started.

I therefore, suggest that this Council, being a competent body to undertake such an important task, should prepare a blue-print formulating an integrated and coordinated programme for Technical training and programme at various levels for Technical personnel from operatives to research workers.

(b) *Teaching personnel—to overcome our immediate and future requirements*

The acute shortage and deficiency in teaching personnel can be overcome by the following measures :—

(a) Ploughing back bright, young Diploma holders and graduates into teaching and research professions.

Training of such pedagogues and teachers is possible by arrangement at Governmental level in Germany, U.S.A. and other foreign countries. Special stipends required to be provided as incentives.

(b) Refresher courses for existing teachng staff at teachers training centres to be established at old institutions where competent staff is available.

(c) Similar scheme for short time visit to Industry which will acquaint the training and educational institutions to understand the needs of the industry and adjust the teaching curriculum accordingly

(d) Honoraria for technical personnel engaged in Industry to undertake teaching of specialised subjects.

Item No. 7 :—To receive a note on the schemes included in the Second Five-Year Plan

At its meeting held on the 30th October, 1954, the All-India Council for Technical Education appointed a Planning Committee to formulate proposals for the development of Technical education to be included in the Second Five-Year Plan. The Council was of the view that in the formulation of the Plan, the following objectives should receive special attention of the Committee along with any other proposals that might be made by the State Governments.

(i) Provision of integrated schemes of apprenticeship training and Technical education in the age groups 14—17 for artisans and craftsmen and 16-21 for supervisory personnel.

(ii) Provision of part-time Technical education facilities for adult workers.

(iii) Provision of Sandwich courses of the degree standard—at least one centre in each important industrial centre.

(iv) Establishment of the Western Higher Technical Institution.

(v) Provision of further post-graduate courses and centres for advanced work and research.

(vi) Appropriate measures for attracting and retaining the right type of teachers in institutions.

(vii) Provision of Summer Schools for Technical teachers and short-team refresher courses.

(viii) Provision of facilities on a regional basis for the training of Technical teachers.

(ix) Institution of scholarships and free places in partnerships with the State Governments.

2. A tentative plan for the development of Technical education during the Second Plan at an estimated cost of Rs. 80 crores was drawn up on the basis of the Planning Committee's report and this was approved by the Coordinating Committee at its meeting held on the 9th June, 1955. The schemes together with their estimated cost may be seen in Annexure I.

3. The tentative plan approved by the Coordinating Committee formed the basis for discussions in the working groups consisting of the Planning Commission, State Governments and the Ministry of Education. On account of the financial limitations, it was possible eventually to include in the Plan, Schemes of Technical Education aggregating to Rs. 48.7 crores—the Central Schemes accounting for Rs. 22.13 crores out of this amount.

4. A list of the Central schemes together with the provision made therefor, may be seen Annexure II.

5. In the State Plans provision has been made for the completion of the schemes already initiated in the first Plan and improvement of existing institutions which could not be undertaken during the First Plan period. The plans also include the establishment of five new Engineering colleges, 21 new Polytechnics and 51 Junior Technical Schools. The location of the new institutions to be started during the Plan may be seen in Annexure III. Some of the States have made provision for starting part time courses and for augmenting the number of scholarships available in the various Technical institutions. In the main however expenditure is proposed to be incurred by the States in developing existing institutions and establishing new institutions or new courses.

6. Apart from direct expenditure on the Central Schemes the Central Government assists the States to enable them to fulfil their programme.

ANNEXURE I

Scheme No.	Name of the Scheme	Estimated Expenditure (Rs. in lakhs) Non-recurring	Recurring	Total
1.	Completion of Scheme first Plan	451	341	792
2.	Practical Training Stipend	50	127	177
3.	Research Training Scholarships	—	90	90
4.	Indian Institute of Technology	200	75	275
5.	Junior Training Schools	1800	708	2508
6.	Apprentice Training	85	113	198
7.	Part-time for Adult Workers	—	20	20
8.	Three Higher Technical Institutions, Western, Southern & Northern	575	175	750
9.	Post-graduate in Engineering	15	5	20
10.	Improvement of salary	—	360	360
11.	Refresher courses & summer courses for teachers	—	8	8
12.	Training of Teachers	4	11	15
13.	Scholarships & Free places	—	100	100
14.	40 New Engineering Polytechnics	425	487	912
15.	New Engineering Colleges	180	120	300
16.	Construction of Hostels	500	—	500
17.	Staff Quarters	500	—	500
18.	Assembly Halls	70	—	70
19.	Strengthening Boards of Technical Education	20	20	40
20.	Lump provision for new schemes such as Central Scheme & Primary etc	30	20	50
21.	Development of Art & Commerce	14	16	30
22.	Post-graduate Development in Affiliated Colleges	100	50	150
23.	Development of Delhi Polytechnic, Delhi	100	35	135
*24.	Training of Foremen			
	TOTAL	5119	2881	8000

*Provision for this item should be found by suitable adjustment in the other items.

ANNEXURE II

Plan provision for Central Schemes of Scientific & Technical Education.

S. No.	Scheme	Provision (Rs. in lakhs)
1.	Practical Training Stipends	75
2.	Development of the Indian Institute of Technology, Kharagpur	250
3.	Establishment of three Higher Technological Institutes	800
4.	Refresher Courses for Technical teachers	8
5.	Training of Technical teachers	15
6.	Loans for the construction of students' hostels	300
7.	Loans for the construction of staff quarters	100
8.	Establishment of Specialised institutes	40
9.	Training of Foremen and Supervisors	75
10.	Research Training Scholarships	75
11.	Scholarships for students in Technical institutions	40
12.	Development of the Delhi Polytechnic	115
13.	(A) Grants-in-aid to non-Government—non-university scientific and Technical institutions for their improvement and development	320
	(B) Grants-in-aid to institutions for special subjects (including Government institution for which State Govts. have made no provision) such as Mining, Metallury etc.	
	Total Rs.	2213 lakhs

ANNEXURE III

Number of New Institutions Provided in the Plan of the State Government

Name of State	*Engg. Colleges*	*Polytechnics*	*Junior Tech. Schools*
Andhra Pradesh	—	2	—
Assam	2	—	—
Bihar	—	—	10
Bombay	—	6	—
Jammu & Kashmir	—	—	4
Kerala	—	1	18
Madhya Pradesh	1	2	5
Mysore	—	2	—
Orissa	1	—	2
Punjab	1	2	6
Rajasthan	—	2	4
Uttar Pradesh	—	2	—
West Bengal	—	2	7
Union Territories			
Himachal Pradesh	—	—	1
Tripura	—	—	1
Total :	5	21	58

Item No. 8.—To receive a report on the implementation of the recommendations of the Engineering personnel Committee

1. Recommendations of the Engineering Personnel Committee

1.1. The Engineering Personnel Committee had recommended that in order to meet the increasing demand for Engineering graduates and diploma holders during the Second Plan period 18 new Engineering colleges and 62 Polytechnics should be established in the

different parts of the country and at the same time the training capacity of the existing institutions should be increased by 20% for degree courses and 25% for diploma courses during the Plan period. This expansion of Technical education facilities recommended by the Committee is in addition to the provision already made by the Central Government and State Governments for Technical education in the Second Five-Year Plan.

1.2. The Committee has estimated that the above expansion of training facilities would yield about 2794 additional seats for the Degree courses and 8220 seats for the Diploma courses. The expenditure on this account will be of the order of Rs. 16 crores.

1.3. The Coordinating Committee considered the above recommendations at its meeting held on the 14th July, 1956 and decided that the Regional Committees should immediately examine the state of development of each institution in their respective areas and wherever the conditions were satisfactory, may authorise an increase in the intake up to 20% in the case of Degree courses and 25% for Diploma courses. As regards new institutions, it was decided that the State Governments should be requested to furnish information regarding the number of institutions they would be in a position to establish and develop having regard to Technical and financial resources available, teaching personnel etc.

2. Need for larger unit size of institutions

2.1 Since the meeting of the Coordinating Committee the Central Government and Planning Commission have carefully considered the question as to the best manner in which the required expansion of Technical education may be brought about. They are of the view that having regard to the available resources and particularly teaching personnel, the establishment of a large number of institutions, viz. 18 Engineering colleges and 62 Polytechnics as suggested by the Engineering Personnel Committee will not be practicable at this stage. The most important limiting factor in multiplying the number of institutions is teaching personnel who are in acute short supply at present. Even for some of the existing institutions which have started recently, serious difficulties are being experienced in getting the right teachers in sufficient numbers. If, in these circumstances, attempts are made in the immediate future to multiply the number of institutions as recommended by the Committee, we may run the risk of establishing very inefficient institutions and lowering the standards. It has also to be borne in mind that the

Second Five-Year Plan already includes the establishment of five new Engineering colleges, 21 Polytechnics and three Higher Technological institutes which require all available Technical and other resources of the Central Government and State Governments concerned. Other means and methods of expanding Technical education to the required extent should be considered.

2.2. The most fruitful and practicable way of expanding Technical education is to enlarge the 'unit size' of the existing and and well-established Technical institutions. At present, the average size of an Engineering college offering a four-year curriculum, though varying from region to region, lies between the limits 400-500 students on the basis of an annual admission of 100-200 students. Only a few institutions, which are an exception to the general rule, have a student-enrolment of 800. The size of a Polytechnic offering a three-year curriculum is about 360 students. There are several institutions, however, which are even smaller than this average size. When we have to train thousands of Engineers and Technicians in the years ahead, we should not only think in terms of multiplying the institutions but also consider the possibility of enlarging the size of existing ones. As a matter of fact, in the circumstances prevailing in the country, the main emphasis should be on the latter approach and new institutions should only be established, if found necessary. It is practicable to have an Engineering college with an enrolment of 1000 to 1600 students and Polytechnics with an enrolment of 600 to 1000 students provided that the instructional facilities are increased correspondingly and the administrative structure is reorganised. This conversion of existing institutions into large units will have several advantages. Firstly, the difficulties attendant upon the establishment of a large number of new institutions will be minimised. Secondly, the process of expansion of Technical education will be hastened. Thirdly certain economies in resources and in teaching personal will be possible.

2.3. The Planning Commission and Central Government have come to the considered view that by carefully adopting the above principles of larger unit sizes for Technical institutions, it should be possible to provide for a substantial part of the additional seats required in the existing institutions and thus reduce the number of new institutions to be established. They decided that Dr. J.C. Ghosh, Member (Education) and Mr. L.S. Chandrakant, Deputy Educational Adviser should hold discussions with the Chairmen of the Regional Committees, States Governments and principals of Technical institutions regarding the possibilities of converting some

of the existing institutions into larger units and formulate detailed proposals in this respect as also the number of new institutions to be established.

2.4. The report submitted by Dr. Ghosh & Mr. Chandrakant is given at Appendix 'B'.

3. Proposals for implementation

3.1. Nineteen existing Engineering colleges and 45 Polytechnics have been selected for being converted into larger units so as to yield about 2540 additional seats for Degree courses & 4225 seats for Diploma courses. For the balance of the requirements, three new Engineering colleges (one in the Durgapur—Asansol area, one in the Tatanagar area & one in Nagpur) and 27 Polytechnics, capable of yielding 520 seats for Degree courses and 4680 seats for Diploma courses are proposed. The present position of Technical education facilities in each region, the expansion proposed in accordance with the recommendations of the Engineering Personnel Committee and the provision for admission by 1960-61 are given in the statement at Annexure II in the Report.

3.2. The present admission capacity of all the existing Technical institutions is of the order of 4980 for Degree courses and 8870 for Diploma courses. The proposals now made as well the provision already included in the Second Plan will increase the facilities to 8680 seats for Degree courses and 18735 seats for Diploma courses. An annual out-turn of about 7500 graduates and 15,000 Diploma holders may be expected.

4. Financial estimates

4.1. It is estimated that the cost of the expansion programme will be as follows :—

Non-recurring—(Buildings & Equipment)	Rs. 1200 lakhs
	Rs. 300 lakhs (max.) per year
Interest-free loans for hostels	Rs. 500 lakhs

The financial estimates for each institution will have to be determined by the Regional Committee concerned after examining the necessary details.

4.2. By investing about Rs. 1200 lakhs on buildings and equipment during the current plan period not only will the provision of facilities for Degree nad Diploma courses increase by 3060 and 8910 seats

respectively but a larger training potential will be generated which can be utilised in the third and subsequent plan periods. In that respect the above financial proposals are an investment for the future also when with small additions to the institutions their training capacity can be further increased.

5. Teachers' Training

5.1. The crux of the problem of Technical education is teachers. Whether for the expansion of existing institutions or for the establishment of new institutions, supply of well-qualified and experienced staff is a *sine que non*. There is at present an acute shortage of teachers of Technical institutions. Unless urgent and far-reaching measures are taken to remedy this position all efforts towards the development of Technical education in the country will fail.

5.2. A constant and adequate supply of teachers is only possible by initiating and developing on a large scale a programme of training for Technical personnel for teaching positions and attracting brilliant young men qualifying from universities and other institutions to this training. For this purpose, a number of senior and junior fellowships are proposed to be created in selected existing institutions to be awarded to promising men, who will be apprenticed to Professors and other senior teachers for stated periods—say three years. During this period, they will participate in the teaching work of the institutions concerned and acquire the necessary experience. They will also do some research depending upon the facilities available and improve their knowledge and abilities. They will spend at least six months in industry to broaden their outlook and practical experience. On completion of the apprenticeship, they will form a pool from which all Technical institutions may recruit teachers to meet their normal and developmental requirements. After every three years the fellowships will be reawarded to fresh candidates ensuring, however, that a certain number of fellowships are available for award every year.

5.3. The fellowships will be of a value which will attract the most talented of our young graduates to teaching work in preference to other types of professional work in industry or Government departments. For senior fellowships to be created in colleges doing work of at least first degree standard, the value will be Rs. 350-25-400 ; and for junior fellowships to be created in Polytechnics of diploma standard, it will be Rs. 250-25-300.

5.4. It is proposed that 50 senior fellowships and 100 junior

fellowships should be created immediately. The number of fellowships in the future years will be so adjusted that at least 25 senior and 50 junior fellowships will be available for award every year to fresh candidates.

6. Conclusion

The Central Government have approved the proposals for the expansion of selected institutions for Degree/Diploma courses, as formulated in the report. In respect of new institutions it has been suggested that the matter should be re-examined so as to attain even development in all the regions and the needs of the third five-year plan for Technical personnel should also be kept in view.

Item No. 9 :—To consider new proposals for development recommended by the various Committees of the Council

Since the last meeting of the Coordinating Committee of the Council, the Regional Committees have made the following recommendations for further development :—

A. EASTERN REGIONAL COMMITTEE

1. Training of Technicians for Refrigeration Industry

A scheme for the courses in accordance with the training of technicians for the Refrigeration industry approved by the Council may be provided for an intake of 30 each at the Bengal Engineering College, Sibpur on a full-time basis and at the Calcutta Technical School on a part-time basis. The institutions may be given grants as follows :—

Bengal Engineering College

Non-Recurring—Buildings (15,640 Sq. ft.)		Rs. 2,52,800
	Equipment	Rs. 1,40,700
	Total	Rs. 3,93,500
Recurring	Staff	Rs. 36,900
	Working expenses	Rs 4,500
	Total	Rs. 41,400
Interest-free loon for hostels		Rs. 93,000

Calcutta Technical School

Non-Recurring	Buildings (including furniture)	Rs. 2,46,600
	Equipment	Rs. 1,25,900
	Total	Rs. 3,72,500
Recurring		Rs. 41,400

In this connection, it may be stated that the scheme prepared by the Western Regional Committee for the training of Refrigeration Engineering Personnel was referred by the Coordinating Committee to the Engineering Board for examination and the Engineering Board observed as follows :—

"In view of the importance of this branch of Engineering, the syllabus Committee should examine the possibilities of—

(i) offering the subject as an elective in the final year Mechanical Engineering Course,

(ii) developing the subject of Refrigeration and Air-conditioning at the National Certificate level."

In view of the above, it is for consideration if further action on the recommendations of the Eastern Regional Committee may be deferred until the Engineering Board has examined the matter and made final recommendations on the training of personnel for Refrigeration Engineering.

B. WESTERN REGIONAL COMMITTEE

1. Victoria Jubilee Technical Institute—Bombay

Nature and scope of development

(i) Additions to the existing facilities for the Degree courses in Civil, Mechanical and Electrical Engineering and Textile Manufacture ; and Diploma courses in Mechanical, Electrical, Sanitary, Automobile Engineering, Textile Manufacture and Technical and Applied Chemistry.

(ii) Increase in the intake of students to the Degree courses in Civil and Mechanical Engineering as detailed below :—

Present Intake	*Recommended Increase*
Civil Engg. 50 students	+ 25 students.
Mech. Engg. 30 students	+15 students.
	40 students.

(iii) Increase in the duration of the Degree courses in Civil, Mechanical and Electrical Engineerg from 3 to 4 years, after this is approved by the University of Bombay.

Annual Intake after the Development Scheme is implemented	*Degree Courses*	*Diploma Courses*
Civil Engineering	75	—
Mechanical Engineering	45	40
Electrical Engineering	30	40
Textile Manufacture	20	40
Sanitary Engineering	—	20
Tech. & Applied Chemistry	—	20
Automobile Engineering	—	20
Total ...	170	180

Estimated developmental expenditure	
Buildings	Rs. 9,00,000
Equipment	Rs. 10,71,850
Furniture	Rs. 25,000
Books and Periodicals	Rs. 50,000
Total ...	Rs. 20,46,850
Interest free loan for hostel for 128 students ...	Rs. 3,60,000

The Institution has been selected for expansion under the scheme for implementing the recommendations of the Engineering Personnel Committee. (refer Item No. 8 on the Agenda). The assessment for the expansion of the Engineering departments will take into account the above grants recommended by the Regional Committee if approved.

2. Govindram Tedi Government Polytechnic—Joara

Nature and scope of development Additions to the existing facilities for conduct of National Certificate Courses in Civil, Mechanical and Electrical Engineering.

		N. C. Courses.
Annual Intake	Civil Engineering	60 students
	Mech. Engineering	20 students
	Electrical Engg	10 students
		90 students

Estimated developmental expenditure

Buildings	...	Rs. 7,61,000
Equipment	...	Rs. 6,52,000
Books and Periodicals	...	Rs. 20,000
Furniture	...	Rs. 35,000
Total	...	Rs. 14,68,000
Interest free loan for hostel for 200 students	...	Rs. 5,10,000

Conditions of Grant

1. Admissions to the various courses will be made strictly on merit except for the seats reserved by the State Government for Scheduled Castes and Scheduled Tribes students.
2. The qualifications and scales of pay prescribed by the Western Regional Committee for various grades of teachers will be strictly adhered to. The number of teachers to be recruited in the institution should not be less than the number indicated in the report.
3. Fresh admissions may be made only after the buildings as recommended in this report are constructed, essential equipment purchased and all teachers recruited. Students already admitted last year may be admitted to the Second Year Class only after the essential laboratories and workshops are completed.

3. Establishment of a Polytechnic at Bhilsa

Nature & scope of development :	Establishment of a new Polytechnic for conducting Diploma courses in Civil Engineering.
Annual In-take	60 students.

Estimated developmental expenditure :

Buildings	...	Rs. 4,35,000
Equipment	...	Rs. 3,75,000
Books & Periodicals	...	Rs. 15,000
Furniture	...	Rs. 35,000
Models and Projector	...	Rs. 10,000
Total	...	Rs. 8.70,000
Interest free loan for hostels for 90 students	...	Rs. 2,63,000

Conditions of Grant

1. Admissions to the courses in the Polytechnic will not exceed 40 in the first two years and 60 thereafter. Admission to all the seats except those reserved for the backward class communities in accordance with the orders of the State Government will be made in order of merit.
2. Appointments to the staff of the Polytechnic will be made on the scales of pay and with the qualifications prescribed by the Western Regional Committee.

4. Engineering College—Gwalior

Nature and scope of development : Establishment of a new Engineering College for conducting Degree courses in Civil, Mechanical and Electrical Engineering.

Annual Intake :

		Degree Course
Civil Engineering	...	60 students
Mechanical Engg.	...	30 students
Electrical Engg.	...	30 students
Total	...	120 students

Estimated developmental expenditure

Buildings	...	Rs. 14,14,000
Assembly Hall		Rs. 2,70,000

Equipment	...	Rs. 15,00,000
Books & Periodicals	...	Rs. 1,20,000
Furniture	...	Rs. 1,65,000
Total	...	Rs. 34,19,000
Interest free loan for hostels for 240 students.....	...	Rs. 4,92,000

Conditions of Grant

1. Admissions will be on merit alone, except for seats which the State Government may reserve for Scheduled Caste/ Tribes students.
2. Appointments to the staff of the College will be made in accordance with the recommendations made by the visiting Committee.

5. Sirdar Vallabhai Polytechnic Institute—Bhopal

Object :—Development of the existing Diploma courses in Civil Mechanical and Electrical Engineering and to increase the intake.

Intake :

		Existing	*Recommended*
Civil Engineering	...	60	90
Mechanical Engineering	...	20	60
Electrical Engineering	...	20	60
		100	210

Estimated Development Cost

Non-Recurring :		
Building and Furniture (19,470 Sq. ft.)	...	Rs. 3,27,500
Equipment	...	Rs. 5,11,000
Total	...	Rs. 8,38,500
Recurring :	...	Nil
Interest free loan for hostel for 280 students	...	Rs. 7,00,000

The grants are subject to conditions laid down in the report of the Visiting Committee.

6. Sir Cusrow Wadia Institute of Electrical Technology—Poona

Object :—Establishment of a Diploma course in Civil Engineering in addition to the existing Diploma courses in Electrical Technology and Radio Engineering.

Intake :	*Existing*	*Recommended*
Electrical Technology	60	60
Radio Engineering	20	20
Civil Engineering	Nil	60
Total	80	140

Estimated Development Cost

Non-Recurring :	
Building and Furniture (11,185 Sq. ft.)	Rs. 1,43,000
Equipment	Rs. 2,02,000
Total	Rs. 3,45,000
Recurring :	Nil
Interest free loan for hostel for 78 students.	Rs. 1,69,000

The grants are subject to conditions laid down in the report of the Visiting Committee.

7. Government Polytechnic—Sholapur

Object : Establishment of Diploma courses in Civil, Mechanical and Electrical Engineering.

Intake :	
Civil Engineering	60
Mechanical Engineering	30
Electrical Engineering	30
Total	120

Estimated Development Cost

Non-Recurring	
Building and Furniture (59,332 Sq. ft.)	Rs. 10,42,000
Equipment	Rs. 8,54,000
Total	Rs. 18,96,000
Interest free loan for hostel for 180 students	Rs. 5,06,200

Recurring : 2.5 to 3.0 lakhs.

The grants are subject to the conditions laid down in the Visiting Committee report.

This is one of the five Polytechnics included by the Bombay State Government in their Second Five-Year Plan and started functioning from June 1956.

8. Sir Bhavsinhji Polytechnic Institute—Bhavnagar

Object :—Establishment of Diploma courses in Civil, Mechanical and Electrical Engineering.

Intake :

Civil Engineering	60
Mechanical Engineering	30
Electrical Engineering	30
Auto. Engineering	30
Total	150

Estimated Development Cost

Non-Recurring :	
Building and Furniture (3836 Sq. ft.)	Rs. 79,300
Equipment	Rs. 5,63,000
Total	Rs. 6,42,300

Interest free loan for hostel for 100 students. Rs. 1,92,000

The development of this institution for Diploma courses in engineering was included in the Second Five-Year Plan of the then State Government of Saurashtra.

The grants are subject to the conditions laid down in the Visiting Committee report. One of the conditions reproduced below may be particularly noted.

> The State Government should discontinue immediately in this Polytechnic existing Diploma courses in Technology of Oils, Soaps and Paints, Oil Technology, Soap Technology and Internal Combustion Engineering and Certificate courses in Weaving and Spinning. The Polytechnic should further discontinue Trade courses for the establishment of which a new centre is being planned in Saurashtra. The Diploma Course in Textile Technology for which there is no sufficient response should be transferred to the R.C. Technical Institute, Ahmedabad.

9. Establishment of an Engineering College at Nagpur

Object :—Establishment of Degree courses in Civil, Mechanical and Electrical Engineering.

Intake :

Civil Engineering	60
Mechanical Engineering	30
Electrical Engineering	30
Total	120

Estimated Development Cost

Non-Recurring

Building and Furniture (1,07,600 Sq. ft.)	Rs. 16,38,000
Equipment	Rs. 15,20,000
Total	Rs. 31,58,000
Interest free loan for hostel for 180 studens	Rs. 4,23,000

The grants are subject to conditions laid down in the Visiting Committee report.

The College has started functioning from the beginning of the current academic session. The former State Government of Madhya Pradesh had included the establishment of a new Engineering college in its Second Five-Year Plan. The Coordinating Committee suggested that this new College might be located in the Bhilai Steel Plant area and it might conduct Mining and Metallurgy courses in addition to Civil, Mechanical and Electrical Engineering. The State Government accepted the recommendation and proceeded to make the necessary arrangements. There is therefore no provision in the State plan for another Engineering college, which however, has been started in Nagpur. In the proposals for the implementation of the Engineering Personnel Committee recommendations (Vide Item No. 8). provision has been made for a new college in Nagpur.

10. Assembly Halls for Technical Institutions

The following institutions in the region should be provided with the facility of assembly halls for the seating capacity indicated and estimated cost shown against each.

Institution	*Seating Accommodation (Persons)*	*Estimated Cost*
(i) College of Engg., Poona.	1200	Rs. 4,78,000
(ii) Victoria Jubileee Tech. Institute, Bombay.	1200	Rs. 4,78,000
(iii) L. D. College of Engg., Ahmedabad.	1200	Rs. 4,78,000
(iv) Walchand College of Engg., Sangli.	800	Rs. 3,01,000
(v) Lukdhirji Engg. College, Morvi.	800	Rs. 3,01,000
(vi) Government Polytechnic, Nagpur.	800	Rs. 3,01,000
	Total Cost	Rs. 23,37,000

The following basis was adopted in the assessment.

(a) To be eligible for this facility, the institution should be fully established and its location is such that for the corporate activities of the students, a meeting place even on a rental basis is not easily available in its immediate neighbourhood.

(b) The assembly hall should provide seating accommodation to all the students on the rolls and the total staff of the institution.

11. Faculty of Technology (including Engineering), M.S. University of Baroda

Supplementary grant on account of increase in cost of equipment Rs. 35,100

On the recommendations of the Coordinating Committee in 1954 the University Grants Commission previously sanctioned a non-recurring grant of Rs. 6.45 lakhs to the Faculty of Technology—M. S. University, Baroda. The University has requested for a supplementary grant of Rs. 1.4 lakhs on account of increase in cost of some of the items of equipment recommended originally. The Regional Committee has assessed the actual increase in cost and recommended an amount of Rs. 35,100.

12. Government Training Institute—Khar

The Committee recommended an amount of Rs. 2,500 for hand leather measuring device and muffle furnace in addition to the grants approved by the Coordinating Committee earlier.

C. SOUTHERN REGIONAL COMMITTEE

1. Establishment of an Engineering College at Waltair in the Andhra University

Object :—Provision of facilities for first degree in Civil, Mechanical and Electrical Engineering.

Intake :—Civil Engineering 60
Mechnical Engineering 20
Electrical Engineering 20

Estimated Development Cost

Non-Recurring

*Building (98,920 sq. ft.) Rs. 14,05,000
Equipment Rs. 14,12,320

*The Regional Committee also recommended the University Grants Commission might review the cost position in respect of acquiring land for the buildings and sanction additional grants.

Library furniture etc.	Rs. 1,07,500
Total	Rs. 29,24,820

Recurring :

Staff	Rs. 2,11,100
Maintenance	Rs. 50,000
Total	Rs. 2,61,000
Interest free loan for hostels for 400 students	Rs. 10,00,000

The following facts are submitted in connection with the above recommendations :

(a) Having regard to the shortage of training facilities in the country as pointed out by the Engineering Personnel Committee it is for consideration if the intake into the Mechanical and Electrical Engineering Courses should not be increased with a view to making full use of the laboratories.

(b) The standards for the staff are being worked out by the Specialist Committee. On receipt of the report of the Specialist Committee, the requirements for the recurring expenditure may be reassessed.

2. Government Technical College—Hyderabad

Loan for construction of hostel for 160 students	Rs. 4,00,000

The institution was approved by the Coordination Committee for development in its 18th meeting held on the 15th June 1954. The sanctioned intake to the approved courses is 190 students per year.

3. Alagappanagar Polytechnic—Alagappa Nagar

Object : Starting now Diploma courses in Electrical and Mechanical Engineering.

Intake :

Mechanical Engineering	25
Electrical Engineering	25

Estimated Development Cost

Non-Recurring :

Building	Rs. 1,33,000

Equipment	Rs. 4,93,000
Total	Rs. 6,26,000

Recurring :

Staff and Maintenance... Rs. 60,000

On the recommendation of the Southern Regional Committee made previously, the following grants were recommended by the Council for the provision of a Diploma Course in Civil Engineering at this Institute :—

Non-Recurring :

Building.....	Rs. 4,92,000
Equipment.....	Rs. 3,82,000

Recurring :

Staff and Maintenance... Rs. 80,000

4. Assembly Halls for Technical Institutions

The Regional Committee has recommended that grants be paid to the institutions shown below for providing Assembly halls :—

Name of Institutions	*Grants Rs.*
Government College, Anantapur	1,50,000
A.C. College, Karaikudi.	2,25,000
Annamalai University, Engineering College	4,50,000
P.S.G. College & Polytechnic	2,00,000
College of Engineering, Bangalore	1,25,000
C.N.T. Institute, Madras	1,00,000
Ramakrishna Mission Technical Institute	36,000

The basis of the above assessment is the provision of Assembly Hall accommodation for 1½ times the total students' body.

5. Loans for Staff Quarters

The Regional Committee recommended that loans at 3% interest be paid to the following institutions for the construction of staff quarters.

(i) College of Engineering, Anantapur	3.5 lakhs
(ii) P.S.G. College, Coimbatore	2.0 lakhs
(iii) Government Polytechnic, Kalamassery	1.5 lakhs
(iv) Seshasayee Institute of Technology, Tiruchirapalli	1.7 lakhs
(v) A.C. College of Technology, Madras	3.25 lakhs
(vi) Government Engineering College, Kakinada	1.4 lakhs

(vii) Engineering College, Annamalai University 3.66 lakhs
(viii) Government Engg. College, Guindy 3.39 lakhs

The recommendations represent 50% of the demands made by the institutions.

6. Establishment of a Polytechnic at Chettinad

The Regional Committee recommended the establishment of a Polytechnic at Chettinad by the Chettinad Trust, offering Diploma course in Civil Engineering for an annual intake of 50 students at the following cost :—

Non-recurring..... Rs. 8.74 lakhs.
Recurring..... Rs. 0.80 lakhs.

A letter from Dr. Alagappa Chettiar making the following points was considered at the last meeting of the Coordinating Committee :-

(a) The Polytechnic attached to the Engineering college at Karaikudi was only recently established and is still awaiting full development.

(b) The new institution is hardly five miles away from Karaikudi and both are located in a rural area. The local people cannot provide students even for one Polytechnic.

(c) Duplication of work involved would dissipate the energies of both the institutions.

The Coordinating Committee decided as follows :—

"Full information concerning the actual conditions prevailing in the Karaikudi Polytechnic, the demand for additional facilities from the local students as well as from outside, the effect of the new institution on the existing one and other related aspects should be obtained."

The following table gives information relating to applications made and the admissions to the two institutions under reference and two others in the adjoining districts :—

Districts	Annamalai Polytechnic		A.C. Polytechnic Karaikudi		Seshasayee Instt. Tiruchirapalli		Tamilnad Polytechnic Madurai.	
	Total appls.	No. admitted	Total appls.	No. admitted	Total appls.	No. admitted	Total appls.	No. admitted
Ramnad	30	20	60	27	72	...		
Tiruchirapalli	18	9	39	11	270	82		

Madurai	5	1	24	6	..	1		
Tanjore	23	11	44	14	74	10		
Total...	81	41	176	58	416	93	677	180
Other districts	45	9	176	39	...	7	...	...
Grand Total..	126	50	352	97	416	100	677	180

An analysis of the above figures is given below :—

	Chettinad Polytechnic	*A.C. Polytechnic, Karaikudi*	*Seshasayee Institute, Tiruchirapalli*
Applications received from local people	30	69	270
Total applications received	126	352	416
Local people admitted	20	27	82
Total admissions...	50	97	100
% of Total admissions to total applications	40%	28%	24.4%
% of local admission to local applications	67%	40%	30%

The Regional Committee has reviewed the case and has reiterated its original recommendation to establish a Polytechnic at Chettinad.

7. Establishment of new Engineering Colleges and Polytechnics by the respective State Governments and the private agencies in the Region

The following new institutions may be established :—

(I) Madras State

(i) *Engineering College at Madura* by the Thiagarajar College Endowment Trust, with an annual intake of 50 in Civil, 25 in Electrical and 25 in Mechanical Engineering. This will be a Non-Government institution and the Madras State Government has agreed to participation in the development cost according to the usual ratio.

(ii) *Five Engineering Polytechnics* with annual admission of 50 in Civil, 25 in Mechanical and 25 in Electrical

Engineering Diploma courses by the following Non-Government organisations :—

(a) At Neiveli by the Neiveli Lignite Project authorities.
(b) At Madras by the A.M.M. Charities Trust.
(c) At Pollachi by Nachimuthu Industrial Association.
(d) At Annamalainagar by the Annamalai University.
(e) At Solan (The name of the Non-Government organisation will be furnished by the State Government later on).

(II) **Andhra Pradesh**

(i) Engineering College at Warrangal to be established by the State Government.

(III) **Kerala State**

One Engineering College and three Polytechnics offering Degree and Diploma courses respectively in Civil Mechanical & Electrical Engineering to be established by the State Government. The exact location of these institutions has not so far been decided.

Provision of Civil, Mechanical and Electrical Engineering at the Government Polytechnic, Kalamassery.

(IV) **Mysore State**

Two Polytechnics to be established by the State Government the exact location to be confirmed by the Government of the reorganised State.

The above recommendations of the Regional Committee may be considered in the context of proposals for implementation of the recommendations of the Engineering Personnel Committee for the Southern Region placed at item No. 8 on the agenda and the provision made by the respective State Governments in their Second Five-Year plans. None of the State Governments have any provision for a new Engineering college in their plans. In so far as Diploma institutions are concerned, only Andhra and Mysore State Governments have each included two Diploma institutions in their Second Five-Year Plans. The Kerala State Government has provision in its Second Five-Year Plan for a Central Technical Institute. (This may be taken as a Diploma institution).

8. J.V.D. College of Science and Technology, Andhra University—Waltair

Objectives of Development : To reorganise the existing three-year course in Chemical Engineering in accordance with the recommendations of All-India Council for Technical Education and to provide for an annual admission of 30 candidates for the four-year course.

Estimated cost :

Non-Recurring :

Building including furniture (41,980 Sq. ft.)	Rs.	6,68,500
Equipment...	Rs.	4,54,300
Total :	Rs.	11,22,800

Recurring :

Additional staff (Professor, Readers & Lecturers)	Rs.	35,000
Consumables, maintenance & Library grant	Rs.	26,000
Total :	Rs.	61,000
Interest free loan for hostel for 84 students	Rs.	2,10,000

The above estimates do not include the expenditure on the rest of the staff viz., Mechanics, Laboratory Assistants etc. as recommended by the Expert Committee, since the scales of salary for these posts have not been laid down by the All-India Council for Technical Education. The University should indicate the scales applicable to these posts and on that basis, the recurring cost estimates should be increased, correspondingly.

The Chairman, Southern Regional Committee has approved the report of the Expert Committee subject to financial scrutiny on the basis of the standards of instructional facilities as laid down by the Chemical Engineering Board. It may, however, be pointed out that the standards on the basis of which the expert Committee has made the assessment are the same as laid down by the Chemical Engineering Board.

9. A.C. College of Technology—Madras

The Coordinating Committee at its 23rd meeting held on 14th July, 1956 had approved the following grants to this institution for reorganising the present two-year course in Chemical Engineering to a four-year course as recommended by the All-India Council for Technical Education :—

Non-Recurring :

Building including furniture (24,670 sq. ft.)	Rs.	3,58,650
Equipment	Rs.	4,10,150
Total	Rs.	7,68,800

Recurring :

Additional Staff and Maintenance	Rs.	78,000
Interest free loan for hostel for 60 students	Rs.	1,50,000

Since the above grants were approved, the Chemical Engineering Board has prepared the necessary standards in respect of accommodation, equipment, staff and other instructional facilities for the four-year course in Chemical Engineering as approved by the Council. It was therefore considered necessary to review the previous assessment made for the A.C. College in the light of the Standards prescribed by the Board. The revised assessment as approved by the Chairman of the Southern Regional Committee is as follows :—

Non-Recurring :

Building including furniture (24,670 sq. ft.)	Rs.	3,58,650
Equipment including Library	Rs.	4,22,650
Total	Rs.	7,81,300

Recurring :

Additional teaching staff	Rs.	61,200
Consumables and maintenance	Rs.	17,400
Total	Rs.	78,600
Interest free loan for hostels for 60 students	Rs.	1,50,000

The above estimates do not include the expenditure on the rest of the staff viz., Mechanics, Laboratory Assistants etc. as recommended by the Expert Committee, since the scales of salary for these posts haev not been laid down by the All-India Council for Technical Education. The University should indicate the scales applicable to

these posts and on that basis, the recurring cost estimated should be increased, correspondingly.

D—NORTHERN REGIONAL COMMITTEE

1. Nilokheri Polytechnic—Nilokheri

Objects : Amalgamation of the Punjab Engineering School and Nilokheri Polytechnic and improvement of the existing facilities at both the institutions, for the Diploma and Draftsmanship courses.

Annual Intake : 150 students per year in the Diploma course — 90 Civil, 30 Electrical, 30 Mechanical

50 students per year in the draftsmanship course — Civil 25, Elec. & Mech. Combined 25

Grants Recommended :

Non-recurring :

Buildings...	Rs.	2,50,902
Equipment...	Rs.	4,84,391
Furniture...	Rs.	30,000
Library...	Rs.	50,000
Total...	Rs.	8,15,293

Recurring

For salary of teaching staff	Rs.	1,60,560
For maintenance grant	Rs.	41,750
For library books & journals	Rs.	5,000
Total...	Rs.	2,07,310
Loan for hostel for 150 students ...	Rs.	11 25,000

Conditions for grants :

1. The Nilokheri Polytechnic and the Punjab Engineering School should be amalgamated and run as one institution.
2. Equipment should be purchased strictly in accordance with the lists recommended by the Visiting Committees.

2 Additional Grants to 11 Diploma Institutions

The Regional Committee observed that grants recommended to Diploma institutions prior to the formulation of standards of buildings,

equipment and staff were very much lower than the standards accepted on the basis of assessment by its expert sub-committee. The cases of 11 such institutions were re-examined in the light of the standards fixed and the Regional Committee recommended the following additional grants to the institutions as detailed below :—

Name of the Institution	Additional Grant Recommended				
	Buildings	Equipment	Library	Furniture	Total
1	2	3	4	5	6
1. Technical College, Dayalbagh, Agra.	2,37,000	4,17,200	11,000	(..) 9,000	6,56,200
2. P.M.V. Engineering College, Mathura.	60,000	1,52,000	5,000	Nil,	2,17,000
3. Hewett Engineering School, Lucknow.	2,32,080	3,86,650	15,000	25,200	6,58,930
4. Civil Engineering School, Lucknow.	3,38,400	3,59,150	28,000	22,300	4,47,850
5. Government Technical Institute, Gorakhpur.	3,21,000	3,58,700	35,000	25,000	7,39,700
6. Government Technical Institute, Lucknow.	2,56,200	4,07,550	35,000	25,000	7,23,750
7. I.D. Technical Institute, Bahjoi.	2,55,360	3,94,500	30,000	(—) 9,000	6,70,860
8. Guru Nanak Engineering College, Ludhiana.	1,80,000	2,39,800	46,300	16,400	4,82,500
9. National Institute of Engineering, Hoshiarpur.	2,88,000	2,46,700	15,000	(—)18,000	5,31,700
10. Government Technical Institute, Ambala.	3,18,000	2,35,675	26,900	5,000	5,85,575
11. Vishwakarma Polytechnic, Phagwara.	3,61,200	4,69,150	42,000	24,500	8,96,850

3. College of Engineering and Technology, Muslim University—Aligarh

The Committee recommended an additional grant of Rs. 14,500 for the purchase of a superheater.

Item No. 10 : To review the demarcation of Regions and the constitution and functions of the Regional Committees

Demarcation of Regions :

In accordance with the States Re-organisation Act, 1956, States have been reorganised into 13 Part A States, one Part B State (Jammu & Kashmir) and six Union Territories. Further the country has been divided into five Zones and Zonal Councils are being set up as Advisory Bodies to advise the Central Government and the Government of each State concerned as to the action to be taken on any matter of common interest to some or all of the States or to the Union and one or more of the States represented in the respective Councils.

The Councils may also discuss and make recommendations with regard to any matter of common interest in the field of economic and social planning.

2. The All-India Council for Technical Education has demarcated the country into four regions for purposes of development of Technical Education. The Regional Committees in the four regions are charged with the responsibility of ensuring a coordinated development within their respective boundaries.

3. It is for consideration if the work of the Council may be reorganised and the country demarcated into five zones or Regions.

4. The demarcation of the country into four Regions with the States prior to Reorganisation and the grouping of the Reorganised States into five Zones as per States Reorganisation Act is shown below :—

Demarcation of Regions

Demarcation in Four Regions of AICTE	*Name of States prior to reorganisation*	*New States*	*Demarcation in Five Zones*
1. Eastern Region	Assam	... Assam	1. Eastern Zone
	Bihar	... Bihar	
	Orisa	... Orrisa	
	W. Bengal	... W. Bengal	
	Manipur	... Manipur	
	Tripura	... Tripura	

2. Northern Region	Himachal Pradesh ..	Himachal Pradesh	2 Northern Zone
	Delhi ...	Delhi	
	Jammu & Kashmir...	Jammu & Kashmir	
	Punjab, Pepsu ...	Punjab	
	Rajasthan & Ajmer Merwara ...	Rajasthan	
	Uttar Pradesh ...	Uttar Pradesh	
3. Western Region	Madhya Pradesh, Madhya Bharat, Bhopal, Vindya Pradesh	Madhya Pradesh	3 Central Zone
	Bombay, Saurashtra, Kutch	Bombay	4 Western Zone
4. Southern Region	Mysore, Coorg ...	Mysore	5. Southern Zone
	Andhra, Hyderabad	Andhra Pradesh	
	Madras ...	Madras	
	Travancore & Cochin	Kerala	

The States reorganisation Act does not provide for the inclusion of two Union Territories viz. Andaman and Nicobar Islands and (ii) Laccadive, Minicoy and Adminidivi Islands in any of the Zones. It is however suggested the Andaman and Nicobar Islands may be included in the Eastern Region and Laccadive, Minicoy and Adminidivi islands may be included in the Southern Region.

5. In case it is decided to divide the country into five regions for purposes of development of Technical education, there will have to be five Regional Committees and Regional Officers instead of four. At present, the Headquarters of the Eastern, Western, Northern and Southern Regions, are located at Calcutta, Bombay, Kanpur and Madras respectively. The question of the location of Headquarters of the new Northern and Central Regions will have to be considered.

Constitution of the Regional Committees

6. As will be seen from the constitution of the Regional Committees given in Annexure-I attached, provision exists for one representative of each of the Part A and Part B States, but none to represent the Union territories. It is suggested the constitution of the Regional Committees be amended to provide for a representative of each of the States and Union Territories included in the Region. The representative of the Union Territories may be no minated by the Administrative Head of the Territory.

7. The Coordinating Committee at its 23rd meeting held on the 14th July, 1956, had considered the question of the revision of the constitution of Regional Committees and recommended to the All-India Council for Technical Education that when the Regional Committees are next reconstituted, their constitution be revised as follows :—

(a) The representation given to the Ministry of Labour D.G.R.E. should be changed to Ministry of Labour—National Council for training in Vocational Trades.

(b) The Association of Principals of Technical institutions should be given one seat on each of the Committees.

(c) Universities having Technological Departments and Technical institutions should together have three seats instead of two seats for each as at present.

It was further decided that if the Ministry of Labour so desired, the National Council in Vocational Trades may be given the representation as soon as it has been formed.

The above recommendation may be approved by the Council.

Functions of the Regional Committees.

8. With the formation of State Boards of Technical Education and Training by the States, the work of examinations will gradually be taken over by them. The Council has also approved the policy of recognising institutions and examinations held by them for award of National Diplomas/Certificates. It is, therefore, suggested that the following function be incorporated in the existing functions of the Regional Committees (shown at Annexure. II *attached*): "To assess the standards and recognise examinations conducted by institutions/organisations for the purpose of endorsement of their awards as National Certificate/Diploma."

ANNEXURE I

Composition of the Regional Committees of the All-India Council for Technical Education

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

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

ANNEXURE-II

Revised Functions of the Regional Committees as Finally Approved by the All-India Council for Technical Education at its Seventh Meeting held on 26th April, 1952

(i) To survey the facilities for Technical education in all stages and to make recommendation to the Coordinating Committee/Council on the development of Technical education, including establishment of new institutions, wherever necessary ;

(ii) To make preliminary examination of any institution seeking recognition and to make recommendations to the coordinating Committee ;

(iii) To tender advice and guidance to Technical institutions within the region, affiliated to the Council and/or in receipt of financial aid or funds from the Central Government as well as to such other institutions as may seek the same.

(iv) To promote liaison between Technical institutions and Industry and other Technical establishments ;

(v) To assist the States and Technical institutions in securing practical training facilities ;

(vi) To appoint Boards of Examiners, taking into consideration the recommendations of the Boards of Technical Studies concerned and to arrange for the proper conduct of examinations ;

(vii) To publish the results of the examinations ;

(viii) To send reports to the Coordinating Committee about the conduct of examinations periodically ; and

(ix) To consider and make recommendations on such other matters as may be referred to it by the Coordinating Committee/ Council.

Item No. 11 :—To receive a note on the establishment of State Boards of Technical Eaucation

Having regard to the expensive development plant for the establishment of Polytechnics and Multipurpose schools, the Southern

Regional Committee had recommeded that the States should have Directorates of Technical Education to coordinate the activities in this field with a view to securing greater efficiency and balanced development. The Coordinating Committee strongly endorsed this recommendation.

The Coordinating Committee strongly endorsed the recommendations of the Northern Regional Committee also that the various States should constitute Boards of Technical Education either independently or in collaboration with contiguous States and that such Boards should *inter alia* conduct the examinations for the award of the National Certificates or State Diplomas.

The Second Five-Year Plan lays great emphasis on expansion of facilities for Technical education and Training for achieving the development visualised in industry, power and irrigation, communications, transport etc. The success of the various schemes of Technical education and training depends upon the adequacy of machinery both at the Centre and in the States for promoting activities in this field. The State Governments were requested to consider the question of setting up a State Board of Technical Education and Training and suggestions were made to them regarding the composition and functions of such Boards as given at the Annexure.

The present position with regard to the establishment of State Boards of Technical Education is given below :—

(a) The State Governments of Assam, West Bengal, Bihar, Orissa, Andhra Pradesh, Madras, Mysore and Bombay have already set up State Boards.

(b) The Governments of Punjab, Rajasthan and Kerala have agreed to the proposal and are taking appropriate steps to set up the Board.

(c) The Governments of Madhya Pradesh, Uttar Pradesh and Jammu & Kashmir, have not yet sent any replies.

ANNEXURE

Outlines of the Constitution and Functions of a State Board of Technical Education

(a) *Constitution* :

(1) State Minister of Education (Chairman).

(2), (3), (4), (5) Four representatives of the State Government Departments, viz., Industry, Labour, P.W.D. & Finance.

(6), (7), (8) Three Principals of Technical institutions.

(9) A representative of Labour.

(10), (11), (12) Three representatives of Industry & Commerce nominated by the Government.

(13) A representative of the Regional Committee of the All-India Council for Technical Education.

(14) A representative of the University.

(15), (16) Two experts either coopted by the Board as a whole or nominated by the Government.

(17) Director of Technical Education/Head of Technical Education Unit (Ex-officio Member and Secretary).

The above composition of the Board may, however, be changed to suit the conditions obtaining in each State.

(b) *Functions* :

(a) To advise the Government on the Coordinated development of Technical education in the State at all levels.

(b) To work in liaison with the Regional Committees of the All-India Council in the formulation of schemes for its area.

(c) To affiliate or recognise institutions not conducting University courses and prescribe courses of study for them.

(d) To inspect institutions periodically and ensure that the standards of the courses and the instructional facilities provided are satisfactory.

(e) To conduct examinations and award diplomas and certificates conforming to the minimum standards prescribed by the All-India Council.

(f) To establish and develop cooperative relationships with Industry and Commerce.

Item No. 12 :—To review the question of affiliation of institutions to the Council for National Diploma and Certificate Courses

1. The All-India Council for Technical Education with the assistance of its Boards of Technical Studies has prepared National Diploma and National Certificate Courses in the different branches of Engineering, Technology, Commerce, Architecture, Management, etc. primarily to serve as a model to Technical institutions for reorganising their courses and maintaining proper standards. The courses have also helped in considering the schemes of improvement of Technical institutions under the Five-Year Plan. Grants for equipment, buildings, staff, etc. have been determined on the basis of the standards of instructional facilities prescribed in the schemes of the National Diploma and Certificate Courses and the institutions concerned have been asked to reorganise their courses, wherever necessary.

2. The All-India Council has granted affiliation to several institutions, since 1947-48, for providing the National Diploma and Certificate Courses and is conducting examinations for the students of those institutions.

Name of Institution	Courses for which affiliated	
	National Diploma	National Certificate
(1)	(2)	(3)
1. Delhi Polytechnic, Delhi.	Commerce, Electrical Engg., Mechanical Engg. Architecture, Applied Art, Chemical Engg., Textile Technology.	Commerce Applied Art., Electrical Engg., Mechanical Engg., Civil Engg.
2. Govt. Engg. College, Jabalpur.	Civil Engineering, Electrical Engg, Mechanical Engg.	— — —
3. Govindram Saksaria Technological Institute, Indore.	—	Electrical Engg., Mechanical Engg, Civil Engineering.
4. Central Technical Institute, Lashkar, Gwalior.	—	Electrical Engg. Mechanical Engg., Civil Engineering.
5. H.R.H. Prince of Wales Technical	—	Electrical Engg. Mechanical Engg.,

	School, Jorhat.		
6.	Assam Civil Engineering School, Gauhati.	—	Civil Engineering.
7.	Government Polytechnic, Nilokheri.	—	Electrical Engg., Mechanical Engg.
8.	S.D. College, Alleppy.	Commerce	—
9.	Travancore Cooperative College, Trivandrum.	Commerce	—
10.	Goenka College of Commerce and Business Administration, Calcutta.	-do-	—
11.	Patna College of Commerce Patna.	-do-	—
12.	Davar's College of Commerce, Bombay.	-do-	—
13.	Y.M.C.A. College of Commerce, Madras.	-do-	—
14.	Fatima Mata National College, Quilon.	-do-	—

3. The above list indicates that out of 14 institutions, seven are affiliated for the National Diploma Course in Commerce. The reason for this is two-fold, (a) in many States, there are no Boards conducting recognised examinations in Commerce and (b) the National Diploma Course in Commerce having been recognised as equivalent to B. Com. Degree in Commerce for purposes of employment, the institutions are attracted to this Course. The institutions at Serial Nos. 3, 4, 5 and 6 are affiliated as a result of their development schemes having been approved under the First Five-Year Plan and pending the setting up of State Boards of Technical Education in the concerned States. Subsequent to the affiliation of institutions at Serial Nos. 5 & 6, the Assam Government have set up a State Board of Technical Education and have agreed to undertake the work of examinations at these institutes from this year.

4. At its meeting held on the 8th February 1953, the Council adopted the policy of "recognising" institutions and examinations conducted by them/or the State Boards for the award of National Diplomas and Certificates, while continuing to hold such examinations itself wherever necessary. No concrete shape has, however, been given to this decision by the Regional Committees ; the institutions continue to be affiliated and not recognised as contemplated by the

Council.

5. One of the important schemes included in the Second Five-Year Plan is to bring about the establishment of Boards of Technical Education or other appropriate bodies in the various States which would be concerned with the conduct of non-University examinations in the Technical subjects and would award Diplomas and Certificates. In view of this scheme and the policy adopted by the Council to "recognise" institutions and Boards etc. the following proposals were submitted to the Coordinating Committee at its meeting held on the 14th July, 1956 :

(a) The All-India Council for Technical Education should give up the function of affiliating institutions for conducting National Diploma and Certificate courses and holding examinations for making these awards. It should be mainly concerned with determining the pattern and standards of Technical studies and advising the Central Government, State Governments, Universities, State Boards, institutions and other authorities on all aspects of Technical education. The Council may, however, endorse the Diplomas and Certificates awarded by institutions, State Boards and other organisations for National Diplomas and Certificates in the appropriate subjects on being satisfied that the students concerned have studied in recognised institutions, that the courses and the examinations held are of the proper standards and that other necessary requirements have been fulfilled. Such endorsement will carry all-India recognition and will facilitate maintenance of uniform standards.

(b) No new institutions should be affiliated to the All-India Council and the affiliation granted to existing institutions should be gradually transferred to State Boards or other appropriate authorities. To this end, efforts should be made to persuade the State Governments to set up their own Boards of Technical Education. As far as possible, there should be only one Board in each State for the whole field of Technical education including Commerce, Applied Art, Architecture and other subjects dealt with by the All-India Council. (The position regarding setting up of State Boards of Technical Education has been explained in item No. 11).

(c) A detailed scheme for the development of Commercial education should be prepared which *inter alia* may provide for the reorganisation of the courses in the different States in accordance with the National Diploma and Certificate Courses and giving of assistance to the institutions concerned for securing the required improvement. (The latest position regarding the preparation of the scheme has been reported under Item No. 3).

6. The Coordinating Committee decided that as the question of discontinuance of affiliation involved certain fundamental issues requiring policy decisions, the matter should be referred to the Council. The matter is now placed before the Council for consideration.

Item No. 13:—To consider the Scheme of Training in Foremanship and Supervision

1. The Coordinating Committee at its meeting held on the 12th November, 1953, approved *inter alia* the recommendation of the Joint Committee on Industrial Administration and Business Management, that a two-year (part-time) National Certificate Course in Foremanship should be organised for persons who are employed in industry in the supervisory cadre and are sponsored by their employers for training.

2. The All-India Board of Technical Studies in Management at its meeting held on the 18th February, 1954, recommended *inter alia* that as an integral part of the national scheme for Management education, a network of facilities for training in Foremanship and Supervision should be organised in all the important industrial centres in close cooperation with industry and Technical institutions. The Board also appointed an Expert Committee to prepare a detailed scheme for the purpose.

The Board recommended that the scheme prepared by the Expert Committee should be circulated to industrial concerns, Technical institutions, Government departments etc. and the Regional Committees be requested to suggest the different centres for organising the courses and the Manner in which they should be organised. The approval of the All-India Council is sought for the scheme and for implementing it on the basis of the detailed proposals to be formulated by the Regional Committees.

Item No. 14:—To consider the recommendations of the Expert Committee on the Scheme for Sandwich Course for National Certificate in Mechanical Engineering

The education and training of Foremen and Supervisors for industry is one of the objectives of the Second Five-Year Plan of Technical Education in the Central Sector. A provision of Rs. 75 lakhs has been made in the Plan for this purpose.

2. A draft scheme for organising a four-year Sandwich course of the standards of National Certificate in Mechanical Engineering was

prepared in the Ministry. The Chairman of the Council appointed an Expert Committee consisting of the following, to examine the scheme and advise on any changes considered necessary and the manner in which the scheme may be implemented :—

(i) Lala Sri Ram—Chairman
(ii) Shri N.N. Sen Gupta,
Director of Training,
Ministry of Labour.
(iii) Shri R.V. Sitaraman,
Formerly Principal,
Jamalpur Technical Institute.
(iv) Shri K.A. Shenoy,
Supdt. of Training,
Tata Iron & Steel Co. Ltd.
(v) Shri Jangbir Singh,
Representative of Ministry of
Heavy Industries.
(vi) Shri R.V. Ramiah,
Representative of Ministry of
Commerce and Consumer
Industries.
(vii) Shri K.C. Sharma,
Representative of the Ministry
of Production.
(viii) Shri B. Sahai,
Representative of the Ministry
of Railways.

3. The Expert Committee has approved the draft scheme (Appendix *D*) and has in particular made the following recommendations.

(i) The training of Foremen and Supervisors may be organised in selected centres in cooperation with industry, For this purpose either the existing Polytechnics should be developed or new institutions established depending upon the conditions obtaining in different industrial centres.

(ii) Trainees should be first given basic workshop training for about 6-8 months and then put on the production machines. The basic training should preferably be provided in the industry itself and for this purpose a small training shop may be set up in the works. If, however, the industry prefers the trainees to come to the works after the basic training, the necessary facilities may be provided in the

institutions.

(iii) Each group of trainees in a shop should be placed under the charge of a competent supervisor and should be paid a suitable honorarium for this extra work. The honorarium so paid and any other expenditure incurred by the industrial concern in providing the training should be regarded as legitimate charges on the works.

(iv) The thickness of the Sandwich viz. the duration of the alternate layers of industrial training and institutional studies may be left to be determined by the institutions and the cooperating industrial concern. In the best interest of the trainees, however, they should not be away from institutions for long periods. Attendance for four days in the works and two days in the institutions alternately each week is considered to be a suitable arrangement.

(v) Candidates for the course should be selected by an aptitude test and the industry should be associated with the selection.

(vi) The allotment of time for the training in the different shops as proposed in the scheme should not be regarded as rigid but as only indicative of the time required to acquire a certain level of skill and practical competence The duration of training in each shop may be varied having regard to the ability of each individual trainee to attain the prescribed minimum level.

4. Through the machinery of the Regional Offices of the Ministry of Education and the Regional Committees of the Council, discussions are currently taking place with the interests concerned to ascertain the possibilities of implementing the scheme at selected centres in the various regions.

5. Approval of the Council is sought to the scheme as formulated by the Expert Committee and to its implementation at different centres in the regions as may be decided upon by the Regional Committees.

Item No. 15 :—Consideration of the Report of the Joint Committee of A.I.C.T.E and U.G.C. on Geology and Applied Geology

1. On the recommendations of the Scientific Manpower Committee, the Central Government assisted for some years selected Universities for the development of facilities for advanced studies and research in Geology and Geophysics. This work has since been

taken over by the University Grants Commission as an integral part of the scheme of development of Universities.

2. In view of the large-scale mineral development projects contemplated in the Second Five-Year Plan and the increasing demand for trained geologists, Applied geologists and geophysicists, it was considered necessary to prepare and implement a comprehensive plan of development of facilities for training and research in these subjects in Universities and other institutions. For this purpose, it was suggested that a Joint Committee of the All-India Council and U.G.C. should be appointed. The Chairman of the Council and the U.G.C. approved the suggestion and a Joint Committee consisting of the following was appointed.

(i) Dr. D.N. Wadia (Chairman)
(ii) Dr. M.S. Krishnan
(iii) Dr. C. Mahadavan
(iv) Dr. W. D. West
(v) Dr. N.N. Chatterjee
(vi) Shri H.O.G. Humphreys
(vii) A nominee of the Indian Colliery Owners Association
(viii) Dr. V.R. Khedker
(Nominee of AICTE)

3. The Report of the Joint Committee is placed before the All-India Council for consideration (Appendix E). The following points arising out of the recommendations of the Committee are submitted to the Council for consideration :—

(a) According to the recommendations of the Committee the Applied Geology course will be available after M.Sc. in Geology stage and will be of one year's duration. That will mean a candidate will take five years after Intermediate in Science to be trained as an Applied Geologist.

(b) There is no possibility of a candidate going in for specialisation either in Geophysics or in Applied Geology, after completing B.Sc. or B.Sc. (Hons) in Geology. In the Indian Institute of Technology, Kharagpur, however, a different pattern has been adopted viz. a three-year integrated Honours course in Applied Geology and Geophysics with Intermediate in Science as the admission qualification. After the Honours course, the candidates can proceed for a two-year specialisation course at post-graduate level either in Applied Geology or in Geophysics leading to M.Sc. degree. Although according to this pattern, a candidate takes five years to get M.Sc. degree in Applied Geology,

the Honours course is also a terminal stage for preparing candidates for employment as Applied geologists at certain levels.

(c) It is for consideration whether the pattern of the courses suggested by the Committee and the duration of training in Applied Geology will produce the much needed Technical personnel in the least possible time consistent with the requisite standards.

(d) The Joint Committee has recommended that the Applied Geology course in the Indian School of Mines and Applied Geology, Dhanbad, should be increased to six years in order that the Associateship of the school could be considered as equivalent to M.Sc. degree in Geology of the Universities. However, the Government of India have recognised the Associateship of the school which is awarded at present after a four-year course as equivalent to M.Sc. degree in Geology for purposes of employment.

The Ministry have raised the above points with the U.G.C. also, but the requisite explanation of the Joint Committee is still awaited.

Item No. 16 :—The consider the suggestions of the Government of Madhya Pradesh regarding replacement of English as medium of instruction in Technical institutions

The Madhya Pradesh Government in their letter No. 989/218/27 dated 24th August, 1955 have stated that a conference of the Vice-Chancellors of the Nagpur and Saugar Universities and the Cabinet Ministers was convened in July, 1955, to consider the question of medium of instruction in the Technical and Vocational institutions. In pursuance of the recommendations made at that Conference, a preliminary examination of the various problems connected with the question of change of medium of instruction was undertaken by the State Government. Before this matter could be pursued further, the State Government have considered it advisable to ascertain the steps proposed to be taken by the All-India Council for Technical Education in this behalf.

2. The main recommendations made at the aforesaid Conference are given below :—

(a) Instruction in the Technical and Professional institutions should be through the medium of Hindi and that Hindi medium should be introduced as soon as suitable technical

terms and textbooks are made available.

(b) English should continue to be the medium of instruction in these institutions until textbooks in Hindi are made available, and

(c) That the Languages Departments should examine the position and indicate within six months :

(i) How long it will take to prepare and publish the textbooks in Hindi required for instruction in these institutions ?

(ii) What will be the most suitable machinery for preparing them ?

(iii) What will be the most suitable date for introduction of Hindi medium ?

The conference also considered the question of the nature of technical terms and decided that :—

(a) The science students in the Universities of the State should be conversant with what are called the "International Terms" along with the terms evolved out of Sanskrit roots, and

(b) The textbooks in science subjects should mention in brackets the International terms along side Hindi and Marathi technical terms.

3. The Coordinating Committee considered the matter at its 22nd meeting held on 31st October, 1955, and expressed the view that the question regarding medium of instruction in Technical institutions raised by the Government of Madhya Pradesh should be considered at a full meeting of the All-India Council for Technical Education. The Committee further suggested that this matter should also be referred to the University Grants Commission. The Commission, when referred to decided to defer consideration of the matter till the recommendations of the Official Languages Commission are available.

4. Recently the University Grants Commission have appointed a Committee under the Chairmanship of Pandit H.N. Kunzru to examine the question of medium of instruction at the University stage and to recommend ways and means of securing an adequate proficiency in English at that stage. The Commission have also recommended to the All-India Council for Secondary Education to consider the question of making English a compulsory subject at the Secondary stage. The Central Advisory Board of Education have also considered this matter and have recommended that Hindi, English and mother tongue or a regional language should be made

compulsory at the Secondary stage and that those whose mother tongue is Hindi should learn one more Indian language.

The matter is now placed before the Council for consideration.

Item No. 17 :—To consider application of Rangaswamy Naidu Education Trust Engineering College for financial assistance

1. This college was established in July, 1956 without prior consultation with and approval of either the All-India Council or its Southern Regional Committee but purely on the basis of the affiliation granted by the University of Madras. The trust, however, approached the Government for financial assistance for the College and the matter was considered by the Coordinating Committee at its 23rd meeting held on 14th July, 1956. The Committee took note of the circumstances in which the College was established and decided not to entertain any application from the trust for financial assistance.

2. The Government of Madras have suggested that the following facts may be placed before the Council for a reconsideration of the above decision.

(a) There is no public notification issued either by the State or Central Government that institutions will not be eligible for assistance from the Governments unless they are established with the prior approval of the All-India Council for Technical Education.

(b) The Government of Madras treats all institutions which are affiliated to any university in the State eligible for assistance under the State Governments' code for grants-in-aid. Since this institution has been granted affiliation by the Madras University, it is eligible for grants-in-aid by the State Government.

(c) The State Government had no knowledge of the establishment and affiliation of the institution to the Madras University until 1st July 1956 when as a result of informal discussions with the Secretary, Southern Regional Committee, the State Government realised that there was a procedural lapse. It was after this that the application for financial assistance was received by the State Government from the promoters.

(d) The whole conception of planned development of Technical education is new and even the Southern Regional Committee began to function as late as October 1955. In the absence of a public notification referred to it is not reasonable or fair to penalise the instiurion.

(e) The State Government cannot neglect any offer from private

philanthropists since such offers are too rare and the need for institutions of this type is too well established.

3. The Southern Regional Committee at its fourth meeting held on 10th August, 1956 considered the views of the State Government and recommended the college for financial assistance in the normal way. The State Government, however, has not indicated that it will participate in the non-recurring cost but its grant-in-aid code as applicable to the institution provides for State assistance towards recurring expenditure.

The recommendations of the Council are sought whether the institution should be given financial assistance.

Item No. 18 :—To consider the question of starting Diploma courses in Electrical and Mechanical Engineering at the Ramakrishna Mission Vidyalaya—Coimbatore

The Government of India under the scheme for Rural Education have selected this institution for development as a Rural Institute. One of the courses offered in the Rural institutes is Diploma course in Civil and Rural Engineering which is of the standard of the National Certificate course in Civil Engineering of the Council but with some bias towards Engineering in relation to rural problems. The Vidyalaya started the course in 1956. It has also proposed to start the normal Diploma courses in Mechanical and Electrical Engineering in the year 1957-58 and 1958-59 respectively.

The above proposal of the Vidyalaya was considered by the Southern Regional Committee at its fifth meeting held on 21-11-56. The Regional Committee observed that the Government of Madras had not supported the proposal and requested the Council for a policy decision as to whether such institutes under the Rural education scheme should be considered for normal development for various Technical education schemes under the Council.

The matter is placed before the Council for consideration.

Item No. 19 :—To consider the quetion of starting Degree courses in Guru Nanak Engineering College, Ludhiana

The Coordinating Committee at its 19th meeting held on 15th April, 1954 approved this institution for starting Diploma courses in Civil, Mechanical and Electrical Engineering. One of the conditions subject to which financial assistance has been sanctioned is that no new courses should be started in the College without the prior approval of the All-India Council for Technical Education. In

October, 1956, the institution after obtaining the necessary affiliation from the Punjab University approached the Central Government for permission to start the Degree courses in Civil, Mechanical & Electrical Engineering and actually admitted students in anticipation of the approval. The Government of Punjab supported the request of the institution for starting Degree courses but expressed their inability to share in the development cost. The Central Government informed the institution that the question of establishing a new Degree institution could only be considered on the basis of the schemes included by the State Government in its Second Five-Year Plan and/or the context of the implementation of the recommendations of the Engineering Personnel Committee. The former State Government of Punjab have, however, not made any provisions in the Second Five-Year Plan for any new Engineering college. As regards the recommendations of the Engineering Personnel Committee proposals are still under consideration regarding the number of new institutions to be started. The College was, therefore, informed that the matter would have to be considered by the Council and until that was done the Degree courses should not be started.

In January, 1957 the State Government informed the Central Government that by suitable readjustments in their plan, a provision of Rs. 4.7 lakhs had been made to be given as assistance to the college for the Degree courses during the plan period.

The Northern Regional Committee at its third meeting held on 28th December, 1956 observed that the case was somewhat analogous to the Engineering college established at Coimbatore by the Rangaswamy Naidu Educational Trust and requested the Council for guidance in the matter of considering applications for assistance from such institutions.

The matter is placed before the Council for decision whether the institution should be approved for the Degree courses and considered for financial assistance. In this connection reference is also invited to *para 7* of the report (Appendix-B) on the implementation of the recommendations of the Engineering Personnel Committee at *Item No. 8* of the agenda which deals with the role of private enterprise in the development of Technical education.

Item No. 20:—To report the establishment of National Council for Training in Vocational Trades and appoint a representative on that body

MEMORANDUM

The All-India Council for Technical Education at its meeting

held on the 28th April, 1949 had recommended that a Central Board be set up by the Government of India, Ministry of Labour for conducting examinations in the different trades and awarding certificates. In pursuance of this recommendation, the Ministry of Labour appointed a Committee to prepare a scheme for the establishment of an All-India Trades Certification Board for the award of certificates of proficiency to craftsmen in the various Engineering and building trades. Another Committee known as the Training and Employment Services Organisation Committee was appointed for considering the lines on which the Directorate General of Resettlement & Employment should be reorganised and developed. Both these Committees recommended that the Central Government should set up an all-India agency for coordinating the craftsmen training programmes in the country, bringing about uniformity of standards and awarding certificates of proficiency in craftsmanship.

The Ministry of Labour, Government of India have accepted the above recommendations and have decided to set up a National Council for Training in Vocational Trades. The constitution and functions of the Council are given in Annexure.

The constitution of the National Council *inter-alia* provides for a respresentative of the All-India Council for Technical Education. The All-India Council is requested to appoint its representative.

ANNEXURE

Functions and Constitution of National Council for Training in Vocational Trades

Functions :

The functions of the Council shall be to :

(1) establish and award National Trades Certificates in Engineering, Building, Textile and Leather trades and such other trades as may be brought within its scope by the Government of India ;

(2) prescribe standards in respect of syllabuses, equipment, scale of accommodation, duration of courses and methods of training ;

(3) affiliate examining bodies with a view to bringing them within the scheme of the award of National Certificates and lay down the standard of proficiency required for a pass in the examination leading to the award of such certificates ;

(4) arrange for *ad hoc* or periodical inspections of Training institutions in the country to ensure that the standards prescribed by the Council are being followed ;

(5) recognise Training institutions run by the Government or by private agencies for purposes of the grant of National Trades Certificates and lay down conditions for such recognition ;

(6) co-opt, if necessary, any person or persons to advise the Council in connection with its work ;

(7) prescribe qualifications for the Technical staff of Training institutions ;

(8) prescribe the standards and conditions of eligibility for the award of National Trades Certificates ;

(9) generally control the conditions for the award of National Trades Certificates ;

(10) recommend the provision of additional training facilities, wherever necessary, and render such assistance in the setting up of additional Training institutions or in the

organisation of additional Training programmes as may be possible ;

(11) advise the Central Government regarding distribution to State Governments of the contribution of the Government of India towards expenditure on Craftsmen Training Schemes ; and

(12) perform such other functions as may be entrusted to it by the Government of India.

Composition :

The Council shall be constituted by the Government of India and shall consist of the following members :—

(a) The Union Labour Minister/Union Deputy Labour Minister —Chairman.

(b) The Secretary to the Government of India, Ministry of Labour.

(c) The Director General of Resettlement and Employment, and one representative each of Ministries of Education, Finance, Commerce and Industry, Works, Housing and Supply, Communications Defence, Railways, Transport, Production, Iron and Steel, National Resources and Scientific Research, Rehabilitation, Irrigation and Power and Planning Commission of the Government of India. Such representatives should, as far as possible, be Technical persons.

(d) One representative each of the Governments of those States which have set up a Council, Board of Department of Technical Education.

(e) Five representatives of Governments of all other States to be nominated by the Government of India.

(f) Five representatives of Employers' Organisations to be nominated by the Central Government in consultation with Employers' Organisations.

(g) Five representatives of the Workers' Organisations to be nominated by the Central Government in consultation with Workers' Organisations.

(h) Five representatives of professional and learned bodies to be nominated by the Government of India.

(i) One representative of the All-India Council for Technical Education to be nominated by that Council.

(j) Two experts to be appointed by the Government of India.

(k) The Director of Employment Exchanges, Ministry of Labour.

(l) The Director of Training, Ministry of Labour, Member-Secretary.

Item No. 21 :—To consider the question of pedagogical training for Technical teachers of Multipurpose schools and also the organisation of Workshops as an emergency measure

1. Under the scheme of Reorganisation of Secondary Education, a number of Multipurpose schools are being established throughout the country. The Multipurpose schools have to provide instruction in diversified subjects including, Technical, Commerce, Fine Arts, and other subjects. The qualifications for the teachers of these courses have been prescribed by the Secondary Education Council and the teachers are also expected to have some practical experience in their respective fields. The Secondary Education Council is of the view that in addition to the basic qualifications and practical experience the teachers should also have pedagogical training. The Council feels that in the absence of suitable facilities for the training of the teachers the development of Multipurpose schools will not progress satisfactorily. It has therefore suggested that facilities for pedagogical training for Technical teachers may be organised on a regional basis.

2. The Secondary Education Council has further suggested that pending the organisation of regular pedagogical training of Technical teachers, Workshops (training seminars) for Technical teachers employed in Multipurpose schools may be organised. At these Workshops the teachers may get opportunities of getting acquainted with not only general principles of classroom management but of receiving guidance as to how to cover the syllabus and reach its objectives. The duration of the Workshop, it is suggested should be about eight weeks.

3. The Secondary Education Council has sought the assistance of the All-India Council for Technical Education in developing a suitable programme for the Workshops in various Technical institutes such as Polytechnics, Engineering colleges, Commerce institutions etc. The All-India Council for Secondary Education with the assistance of American experts have already organised a number of seminars and Workshops for the Science and Arts teachers, at various centres in the country. The Secondary Education Council has also sought the assistance of All-India Council for Technical Education in

organising the pedagogical training of the teachers on a long-term-basis.

Item No. 22 :—To consider the requirements for staff, maintenance expenses etc. for an Engineering institution offering first degree or equivalent courses in Civil, Electrical and Mechanical Engineering

The Engineering and Metallurgy Board prepared sometime back a model scheme of instructional facilities viz. buildings and equipment required for an Engineering institution offering the first degree or equivalent courses in Civil, Mechanical and Electrical Engineering. The scheme has since been approved by the Coordinating Committee at its 21st meeting held on 9th June, 1955. It however, did not include the requirements for staff, maintenance expenses etc. The Board with the assistance of an Expert Committee has now prepared these details which are given in Annexure and are for the approval of the Council.

ANNEXURE

1. Details of Staff required for an Engineering institution of the first degree level with an annual admission of 100 to 120 students and offering courses in Civil, Machanical and Electrical Engineering.

(a) *Teaching Staff* :

Principal :—There should be a separate post of principal in addition to the Heads of Departments. He should be in charge of the organisation and administration of the institution as a whole. He should, however, do about four hours per week of teaching work in his own subject.

Summary of Teaching Staff

	Professors	Asstt. Prof. or Readers	Lecturers	Junior Lecturers
Deptt. of Civil Engineering	1	3	4	5
Deptt. of Mechanical Engineering	1	4	5	5
Dept. of Electrical Engineering	1	3	5	4
Mathematics, Science and Humanities	—	1	5	4
Total :	3	11	19	18

The Junior Lecturers provided are intended to assist the teaching staff in laboratory work, drawing classes and tutorials but they are not expected to handle any lecture classes.

Subjects in common for Mechanical and Civil Engineering are handled in the Department of Mechanical Engineering in some institutions and in the Department of Civil Engineering in others. The following detailed schedule showing the allocation of different grades of posts to the different subjects and Departments should therefore be adjusted to suit the set up of individual institutions while the general basis indicated should be maintained.

(i) *Department of Civil Engineering*

Professor—1	Asstt. Professors or Readers—3	Lecturers—4	Junior Lecturers—5
He should be the Head of Department and have overall charge	(a) Structures (b) Materials (c) Hydraulics Irrigation and Water Supply etc	(a) Geology (b) Drawing (c) Hydraulics Irrigation and Water Supply (d) Survey	(a) Survey (b) Materials (c) Drawing (d) Geology (e) Hydraulics

(ii) *Department of Mechanical Engineering*

Professor—1	Readers or Asstt. Professor—4	Lecturers—5	Junior Lecturers—5
He should be the Head of the Department and have overall charge	(a) Heat Engines (b) Machine Design (c) Applied Mechanics including theory of M/C (d) Hydraulic Machines	(a) Drawing (b) Workshop Technology (c) Heat Engines (d) Applied Mechanics (e) Metallurgy	(a) Workshop Technology (b) Drawing (c) Hydraulic M/C Lab. (d) Heat Engines (e) Lab.

(iii) *Department of Electrical Engineering*

Professor —1	Asstt. Professors or Readers—3	Lecturers—5	Junior Lecturers—4
He should be the Head of the Department and have overall charge	(a) Electrical Machinery (b) Utilisation or Measurement or any other special feture in the institution (c) Applied Electronics	(a) Electric Technology (b) Electric Measurements (c) Electric Engineering Design (d) Electronics (e) Electrical Laboratories	(a) Measurements Lab. (b) Electronics Lab. (c) Electric Design (d) General Electric Lab.

(iv) *General Subjects*

Asstt. Professor—1	Lecturers—5	Junior Lecturers—4
(a) Mathematics	(a) Mathematics (b) Physics (c) Chemistry (d) Humanities and (e) Provision for evening of load	(a) (b) Physics (c) (d) Chemistry

(b) *Workshop Staff* :

Chief Foreman Instructor	1
Foreman Instructors	2
Mistry of Instructors (one for each trade)	8
Skilled Workmen (different trades)	12

(c) *Office and other Staff* :

Store keeper	1
Librarian	1
P. A. to Principal	1
Head Clerk	1
Clerk and Typists	8
Peons and Sweepers	15

2. *Running expenditure* :

Provision should be made for consumables, power, water, light etc. for the various departments as indicated below :—

(a) Department of Mechanical Engineering	Rs. 20,000
(b) Department of Electrical Engineering	Rs. 15,000
(c) Department of Civil Engineering	Rs. 5,000
(d) Science, Mathematics and Humanities	Rs. 10,000
(e) Library books and Journals	Rs. 10,000
Total :	Rs. 60,000

3. *Furniture Grant (Non-Recurring)* :

The total amount required is Rs. 1,00,000 which may be distributed as follows :—

(a) Class room furniture Rs. 20,000

(b) Drawing Halls equipment (for about 200 students)	Rs.	30,000
(c) Staff Rooms furniture	Rs.	12,000
(d) Office and Common Rooms furniture	Rs.	10,000
(e) Laboratories etc	Rs.	10,000
(f) Library furniture	Rs.	10,000
(g) Stores furniture	Rs.	8,000
Total :	Rs.	1,00,000

4. *Library Grant (Non-Recurring)* :

(a) *For initial purchase of library books	Rs.	50,000
(b) For purchase of bulk numbers of Journals etc	Rs.	20,000

*This amount should be used specifically for this purpose and not transferable

Item No. 23 :—To consider the proposal for reorganisation and expansion of the Indian School of Mines and Applied Geology, Dhanbad

1. The Principal, Indian School of Mines and Applied Geology, Dhanbad has prepared a scheme for the reorganisation and expansion of the school during the Second Five-Year Plan. The scheme which is estimated to cost Rs. 121.63 lakhs envisages the following :—

(i) Provision of adequate instructional facilities for the existing Diploma courses in Mining and Applied Geology and to increase the admissions to these courses from 55 to 100 per year

(ii) Institution of new courses in Applied Geophysics, Petroleum Technology and Metallurgy.

(iii) Provision of residential accommodation for the Staff and students

2. The Ministry of Natural Resources and Scientific Research desired that the scheme should be examined by the All-India Council for Technical Education and its recommendations obtained.

3. The Chairman, All-India Council for Technical Education decided that the scheme in so far as it related to the courses in Mining, Applied Geology, Petroleum Technology and Applied Geophysics should be examined by the Expert Committee on Mining with coopted experts in Petroleum Engineering and Geophysics, if necessary. He also decided that the proposal for the introduction of Metallurgy courses should be referred to the Expert Committee on

Metallurgy of the Council.

4. The Expert Committee on Mining has examined the scheme and reported as follows :

(i) Till now, the attainment of the highest possible level of work in the school has been largely frustrated due to a variety of causes, the chief of which are inadequate instructional facilities and staff. It is, however, important that the situation should change immediately and the institution should be developed as the Government's highest Technical institute for undergraduate, post-graduate and research work in Mining, Geology and associated subjects. For this purpose, the set up of the school should be reorganised on the lines of the Indian Institute of Technology, Kharagpur.

(ii) There is a great need for the expansion of facilities for training in Mining Engineering. The Expert Committee has already recommended that the annual admissions to the Mining course at the school should be increased to 80 per year.

(iii) In view of the rapid developments taking place in Oil exploration and Oil mining and the inadequate training facilities available in these subjects, Applied Geophysics and Petroleum Technology should be provided in the Indian School of Mines as these subjects form an extension of the present activities of the school in Mining and Applied Geology. The admissions to the Geophysics and Petroleum Technology courses may be limited to 20 per year.

(iv) In order to attain the above objectives, the facilities in respect of accommodation and equipment, in the school should be provided as shown in Annexure I.

Since residential accommodation is practically non-available in Dhanbad, the provision of necessary residential buildings both for staff and students cannot be postponed. However, the requirements of residential accommodation for the staff should be assessed on the basis of the new staff structure proposed and normal scale of accommodation prescribed by the Government for officers of equivalent rank and salary.

(v) The staff position in the school is far from satisfactory both from the point of view of numbers and quality of work required to be done for under-graduate and post-graduate studies. This is chiefly due to the low scales of salary prescribed in the school and the great demand for qualified

personnel from industry, with better financial and other prospects. In consideration of the need for developing the school as a foremost Technological centre for Mining, Geology, Geophysics & Allied subjects it is urgent to improve the existing situation and create such conditions as will attract the best talent available for the staff. For this purpose, the Committee suggests reorganisation of the staff structure and salary scales as shown in Annexure II.

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

ANNEXURE I

Building and Equipment Recommended

	Building		Equipment including furniture
	Area Sq. ft.	Cost Rs.	
A. *Instructional Facilities*			
1. Coal Mining & Mining Machinery	5,606	1,38,688	4,37,300
2. Metal Mining & Survey	8,403	77,840	2,17,693
3. Applied Geology	48,00	76,000	2,02,000
4. Applied Geophysics	48,00	1,15,200	3,80,000
5. Petroleum Technology. (Mining)	5,300	1,27,200	3,80,000
6. Engineering	11,706	2,12,868	2,07,700
7. Chemistry, Fuels & Metallurgy	10,800	1,77,000	2,93,500
8. Physics & Mathematics	—	49,600	2,61,500
9. Languages & Humanities	4,470	72,000	11,800
10. Lecture Theatres	—	1,12,000	44,000
B. *General*			
1. Central Instrument Repair Shop	—	—	51,500
2. Library	5,721	91,538	1,59,115
3. Post-Graduate practical training	1,230	19,680	10,500
4. Administration.	—	75,000	33,550
5. Health Hygiene and Dispensary	1,125	18,000	9,500
TOTAL :		13,63,414	26,99,658

C *Hostel Accommodation*

340 Rooms of 90 Sq. ft. each	Rs.	4,90,000
Extra for baths dining rooms etc	Rs.	1,32,000
Total cost of Building	Rs.	6,22,000
Cost of furniture etc	Rs.	1,20,000

The above approved estimates for building and equipment do not include :

(a) the requirements of the separate course in Metallurgy and

(b) the facilities to be created in the department of Chemistry, Fuels and Metallurgy on account of the separate course in Metallurgy.

The scheme, in addition to the above, provided for Gymnasium, physical instruction and recreational facilities such as sports parillion, tennis courts and swimming pool estimated at a cost of Rs. 4,16,280 for buildings and Rs. 17,428 for equipment. The Expert Committee recommended that appropriate facilities for sports and recreation should be provided in the school.

ANNEXURE—II

	Senior Professor	Professor	Assistant Professor	Lecturer	Assistant Lecturer	Laboratory Supervisor
Mining including Coal & Metal	1	2	2+3	2+2	2+2	Ten in all. Same as Asstt. Lecturer's grade.
Geology & Geophysics	1	1	2+1	1+1	3	
Engineering (Mech. & Elec.)	1	1	3+1	2+2	2+2	
Petroleum Technology	1	1	1	2	2	
Mathematics		1	1	2	1	
Physics		1	1	2	1	
Chemistry		1	1	2	1	
Practical Training		1	4	—		
Humanities		1	—	4		
	Workshop :	1 Foreman (Rs. 260-500)				
		6 Instructors (Rs. 200-300)				

The salary scales should be as follows :—

Senior Professor	1600—1800
Professor	1000—1500
Asstt. Professor	600—1150
Lecturer	350— 850
Asstt. Lecturer or Lab. Supervisor	260— 500

ANNEXURE II (*Contd.*)

ADMINISTRATION

DIRECTOR (Rs. 2000-100-2500/-)

REGISTRAR (Rs. 1000-50-1500/-)

Account Office (500-800)	Administrative Officer (500-800)	Technical Officer (500-800)
2 Assistants+2 U D.C. +2 L.D.C.	2 Assistants+3 U.D.C. +3 L.D.C.	2 Assistants+3 U.D.C. +3 L.D.C.

Library :

Librarian—1 (350-850)
Asstt. Librarian—2 (260-500)
Steno —1
Library Assistant —3 (160-400)
Class IV staff—as per original proposal in the Scheme.

N. B. A small margin on the total cost as indicated above may be allowed for certain other posts not discussed here.

APPENDIX—B

Report on the Implementation of the Recommendations of the Engineering Personnel Committee

1. *Recommendations of the Engineering Personnel Committee*

1.1. In September 1955 the Planning Commission appointed an Engineering Personnel Committee to undertake an over-all assessment of the demand and supply position in respect of Engineering personnel—graduates and diploma holders—during the Second Plan period and to recommend the extent to which facilities for Technical education should be expanded. The Committee in its report submitted in May 1956 has observed that at the end of the Second Plan period and on the basis of the existing provision for Technical education in the country and schemes of expansion already included in the Second Five-Year Plan, there will be a serious shortage of Technical personnel for the execution of the various programmes of national development. The Committee has estimated that on the basis of the demand and supply position the shortage will be of the order of 1800 Engineering graduates and 8000 Diploma holders by 1960-61. In order to bridge this large gap the Committee has emphasised the need for further expansion of Technical education facilities during the Plan period itself. The various schemes of Technical education already included in the Second Five-Year Plan and which have been taken note of by the Committee in assessing the supply position comprise the establishment of three Higher Technological Institutes in the Western, Northern and Southern regions by the Central Government and the establishment of new five Engineering colleges and 21 Polytechnics by the different State Governments.

1.2. The Committee is of the view that in planning for Technical education, it is not merely the immediate demand of Technical personnel which has to be taken into consideration but the needs of subsequent Plan periods when technological activities will be undertaken on a more extensive scale, and for that purpose, adequate supply of manpower to be ensured. The training of an Engineering graduate extends over a period of four years and of a Diploma holder over three years. The establishment and development of a good

Technical institution itself is a long process extending over several years. An integrated and statistical approach to the problem of Technical manpower will therefore be an inseparable component of the plan of national development.

1.3. For meeting the additional demand for Engineering graduates and Diploma holders during the current Plan period, the Committee has recommended that 18 new Engineering Colleges and 62 Polytechnics should be established; and at the same time the training capacity of the existing institutions in the country should be increased by 20% in the case of Degree courses and 25% in the case of Diploma courses. These additional institutions and the proposed expansion of existing institutions are estimated to yield 2794 additional seats for Degree courses and 8221 additional seats for Diploma courses. Even with these developments the demand for Diploma holders will only be met to the extent of about 75%.

1.4. The Committee has recommended that the manner of establishment and region-wise distribution of the 18 new Engineering colleges and 62 Polytechnics should be decided by the All-India Council for Technical Education. It has, however, suggested for the consideration of the All-India Council the following region-wise distribution on the basis of the demand and supply position in each area and with a view to attaining, so far as may be possible proper regional balance in Technical personnel :—

Region	Number of new institutions to be established	
	Colleges	Polytechnics
Northern	4	17
Western	5	11
Eastern	8	29
Southern	1	5
Total	18	62

1.5. The Committee has estimated that the cost of the above development will be of the order of Rs. 16 crores during the Plan period.

1.6. The region-wise distribution of the additional number of seats for the Degree and Diploma courses, both by the establishment of new institutions and 20 to 25% expansion of the existing ones (on

the basis of the 1955 intake) will be as follows :—

Region	Number of additional seats for Degree courses			Number of additional seats for Diploma courses		
	New Institutions	Expansion of existing institutions	Total	New institutions	Expansion of existing institutions	Total
Eastern	960	110	1070	2900	322	3222
Western	515	208	723	1125	513	1638
Northern	440	142	582	1760	435	2195
Southern	130	289	419	440	726	1166
Total for 4 Regions	2045	749	2794	6225	1996	8221

The subject-wise distribution of the above seats for each region is shown in Annexure I

The present admissions (1956) are of the order of 5150 for Degree courses and 9000 for Diploma courses. According to the schemes already included in the Second Five-Year Plan these will increase to 6400 for Degree courses and 11000 for Diploma courses by 1961.

2. *Need for Larger Unit Size of Institutions*

2.1. The question as to the best manner in which the required expansion of Technical education, may be brought about has been carefully considered by the Central Government and Planning Commission. They are of the view that having regard to the available resources and particularly teaching personnel, the establishment of a large number of institutions viz. 18 Colleges and 62 Polytechnics as suggested by the Engineering Personnel Committee will not be practicable at this stage. The most important limiting factor in multiplying the number of institutions is teaching personnel who are in acute short supply at present. Even for some of the existing institutions which have started recently, serious difficulties are being experienced in getting the right teachers in sufficient numbers. If in these circumstances, attempts are made in the immediate future to multiply the number of institutions as recommended by the Committee, we may run the risk of establishing very inefficient institutions, and lowering the standards. It has also to be borne in mind that the Second Five-Year Plan already includes the establishment of five new Engineering colleges, 21 Polytechnics and three Higher Technological

institutes which require all available technical and other resources of the Central Government and State Governments concerned. Other means and methods of expanding Technical education to the required extent should be considered.

2.2. The most fruitful and practicable way of expanding Technical education is to enlarge the 'Unit Size' of the existing second well-established Technical institutions. At present, the average size of an Engineering college offering a four-year curriculum, though varying from region to region, lies between the limits 400—500 students on the basis of an annual admission of 100—120 students. Only a few institutions, which are an exception to the general rule, have a student-enrolment of 800. The size of a Polytechnic offering a three-year curriculum is about 360 students. There are several institutions, however, which are even smaller than this average size. This unit has been evolved over the past 25 years or more and is based on certain technical considerations viz. size of a class for lectures, size of a class for effective workshop and laboratory work, student-teacher ratio, etc. The rather limited demand for Technical personnel in the past was also another important factor in limiting the unit size of an institution. When we have to train thousands of Engineers and Technicians in the years ahead, we should not only think in terms of multiplying the institutions but also consider the possibility of enlarging the size of the existing ones. As a matter of fact, in the circumstances prevailing in the country, the main emphasis should be on the latter approach and new institutions should only be established, if found necessary. It is practicable to have an Engineering college with an enrolment of 1000 to 1600 students and Polytechnics with an enrolement of 600 to 1000 students provided that the instructional facilities are increased correspondingly and the administrative structure is reorganised. This conversion of existing institutions into larger units will have several advantages. Firstly, the difficulties attendant upon the establishment of a large number of new institutions will be minimised. Secondly, the process of expansion of Technical education will be hastened. Thirdly, economies in resources and in teaching personnel will be possible.

2.3. It is most important to bear in mind that not all the existing institutions in the country can be made into bigger units. Many of them are in various stages of development and have been established only recently. Larger units mean more effective pooling of the resources, planning and administration. In this respect, the availability of teaching personnel and the experience of the institutions are of crucial importance. The standards of instruction should be maintained

at the highest possible level and no expansion should be undertaken which is likely to result in the lowering of standards. In selecting the institutions for expansion it is, therefore, essential to bear in mind the status of the institutions concerned, the standards which they have maintained, the present state of their development, the resources available particularly in respect of teaching personnel etc. Each case should be examined on its merits and a very careful selection should be made of the institutions which might be entrusted with the responsibility of becoming bigger units.

2.4. The Planning Commission and Central Government have come to the considered view that by carefully adopting the above principles of larger unit sizes for Technical institutions it should be possible to provide for a substantial part of the additional seats required in the existing institutions and thus reduce the number of new institutions to be established. They decided that Dr. J.C. Ghosh, Member (Education) Planning Commission & Mr. L.S. Chandrakant, Deputy Educational Adviser (Technical), Ministry of Education, should hold discussions with the Principals of Technical institutions in the different regions, representatives of State Governments concerned and Chairmen of the Regional Committees regarding the possibility of converting some of the existing institutions into bigger units and formulate detailed proposals in this respect and also determine the number of new institutions required.

2.5. After a careful examination of the matter in all its various aspects and discussions with the Chairmen of the Regional Committees, State Governments and Heads of Technical institutions, detailed proposals have been formulated in this report for converting 19 existing Engineering colleges and 46 existing Polytechnics into bigger units so as to yield 2538 additional seats for the Degree courses and 4225 additional seats for the Diploma courses. For the balance of the requirements, the establishment of three new Engineering colleges and 27 new Polytechnics capable of yielding 520 seats for Degree courses and 4680 seats for Diploma courses are proposed.

2.6. So far as the Diploma courses are concerned an unanimous view has been expressed by all concerned that simultaneously with the expansion of selected existing Polytechnics, a number of new Polytechnics should be established, so as to provide sufficient opportunities for students completing Secondary education to receive Technical training for gainful employment in life. In this respect, the problem is not merely one of adjusting the demand and supply of Technical manpower for various projects but of diversification of educational opportunities for the large number of students who will otherwise go unnecessarily

for University education and create serious social problems. It will be necessary to have eventually a Polytechnic in every District Headquarters in the country and from now on, efforts should be directed towards the attainment of this objective.

2.7. The diversification of educational and training opportunities should really begin much earlier, namely as soon as the boy attains the 14th year and has completed free compulsory education. At that stage the educational system should provide for the large number of boys a course of 'preparation' for gainful employment in life. The Junior Technical School or Secondary Technical School as recommended by the All-India Council for Technical Education is a suitable means of achieving that objective. When a sufficient number of such schools are established and the courses of training properly organised it will be possible to reduce the duration of Diploma courses in the Polytechnics for those who have studied in the Junior Technical School, or at least to make the Polytechnic education more useful and effective.

3. *Detailed Proposals for Four Regions*

The proposals formulated for the expansion of existing institutions and establishment of new institutions for Degree and Diploma courses in the different regions are as follows :—

3.1. **Eastern Region**

Degree Courses

3.11. Four Colleges, viz., Bengal Engineering College, Sibpore, College of Engineering and Technology, Jadavpur, Bihar Institute of Technology, Sindri and Birla Institute of Technology, Ranchi, have been selected for being converted into larger units. When this expansion takes place, each institute will have a student-enrolment ranging from 1000 to 1600. It is proposed that the first three institutes should conduct Degree courses in Tele-communication Engineering for providing the much-needed facilities in this subject. It is also proposed that the Assam Engineering College, Gauhati, which started last year and which is conducting only Civil Engineering Degree courses at present should have Departments of Electrical & Mechanical Engineering for the Degree courses in these subjects, so that the institute may become a complete unit for all the three basic faculties of Engineering and train the personnel required for the State.

3.12. The present sanctioned intake capacity of the institutions, the proposed intake capacity and the additional seats available are as

follows :—

Institute	Present sanctioned admission capacity	Proposed admission capacity	Additional seats available
Bengal Engineering College, Sibpore.	140	320	180
College of Engineering and Technology, Jadavpur.	140	310	170
Bihar Institute of Technology, Sindri.	60	240	180
Birla Institute of Technology, Ranchi.	132	270	138
Assam Engineering College, Gauhati.	60	120	60

3.13. The details of the course-wise or subject-wise distribution of the above seats are given in Annexure—II. When the expansion of the existing institutions takes place 728 additional seats for Degree courses will be available.

3.14. It is proposed that in addition to the above expansion, two new Engineering colleges should be established in the region, one in the Durgapur-Asansol area and another in the Jamshedpur area, each with an intake of about 200 students.

Diploma Courses

3.15. For the Diploma courses, it is proposed that 1550 additional seats may be provided by expanding (a) eight existing Polytechnics in West Bengal so as to yield 810 additional seats ; (b) two existing Polytechnics in Bihar so as to yield 240 additional seats ; (c) three Polytechnics in Orissa so as to yield 300 additional seats, and (d) two Polytechnics in Assam so as to yield 200 additional seats.

3.16. The Bihar Institute of Technology, Sindri is also conducting Diploma courses in Civil, Electrical and Mechanical Engineering. With the proposed expansion of the institute for the Degree courses it will not be desirable for it to continue the Diploma courses. It is, therefore, proposed that a separate Polytechnic should be established, preferably in Dhanbad to which the present Diploma courses conducted in the Bihar Institute should be transferred. This new Polytechnic should be planned for an admission capacity of 240 students.

3.17. It is proposed that in addition to the above, eight Polytechnics be established in the region, viz., four in West Bengal ; two in Bihar ; one in Assam ; and one in Orissa. Each institute may have an

admission capacity of 180 students (120 for Civil, 30 for Electrical and 30 for Mechanical). Exact location of these institutions may be left to the State Governments concerned to decide in consultation with the Eastern Regional Committee.

3.2 Western Region

Degree Courses :

3.21 Four Colleges, viz., Poona Engineering College, L. D. Enginerring College, Ahmedabad; College of Engineering, Baroda University and Government Engineering College, Jabalpur have been selected for being converted into larger units, each having student-enrolment ranging from 750 to 1000. It may be mentioned here that the duration of the Degree course in the institutions in Bombay State being three years, the student-enrolment will be less than in institutions in the Eastern Region for the same order of expansion.

3.22 It is also proposed that the admission capacity of the Victoria Jublee Technical Institute, Bombay be increased by about 25%.

3.23 The present intake capacity of the institutions, the proposed intake capacity and the additional seats available are as follows :—

Institute	Present sanctioned admission capacity	Proposed admission capacity	Additional seats available
Poona Engineering College, Poona.	140	280	140
L.D. Engineering College, Ahmedabad.	100	300	200
College of Engineering, Baroda University.	75	240	165
Government Engineering College, Jabalpur.	115	280	165
Victoria Jubilee Technical Institute, Bombay.	110	140	30

3.24 The details of the course-wise or subject-wise distribution of the above seats are given in Annexure—II. When this expansion takes place, 700 additional seats will be available for the Degree courses.

3.25 It is proposed that in addition to the above expansion, one new Engineering college should be established in Nagpur with an admission capacity of 120 students (60 for Civil, 30 for Mechanical and 30 for Electrical). As a matter of fact, the State Government have already started an Engineering college in Nagpur, which, however, had not been included in the approved Second Five-Year Plan of the State, by utilising the secretariat buildings available in Nagpur consequent on the States Reorganisation. This new college has to be counted against the additional college proposed in this report.

Diploma Courses :

3.26 For the diploma courses, it is proposed that 450 additional seats may be provided by expanding (a) three Polytechnics in Bombay State so as to yield 160 additional seats and (b) three Polytechnics in Madhya Pradesh so as to yield 290 additional seats.

3.27 The Poona Engineering College, L. D. College of Engineering, Ahmedabad and College of Engineering, Baroda University are all conducting at present, Diploma courses in Civil, Electrical and Mechanical Engineering in addition to the Degree courses. With the proposed expansion of these institutions for the Degree courses, it is not desirable that they should continue the Diploma courses. It is, therefore, proposed that three separate Polytechnics should be established in Poona, Ahmedabad and Baroda to which the present Diploma courses conducted in the Engineering colleges should be transferred. Each of these Polytechnics should provide for an annual admission of 300 students.

3.28 It is also proposed that one large Polytechnic should be established in the Bombay City with an annual admission of 300 students. In addition five Polytechnics should be established in the region, viz., three in Bombay State and two in Madhya Pradesh State each with an intake of 120 students. The exact location of these institutions may be left to the State Governments concerned to decide in consultation with the Western Regional Committee. The Government of Madhya Pradesh has, however, established a Polytechnic in Bhilsa which is not included in the State Second Five-Year Plan. One of the Polytechnics suggested for this State should therefore be counted against this institution. It is also proposed that in the establishment of the new Polytechnics, the State Government concerned may take full advantage of any private initiative or enterprise that might be available for the development of Technical education.

3.3 Northern Region

Degree Courses :

3.31 Four colleges, viz., Roorkee University, Engineering College, Banaras Hindu University, Birla Engineering College, Pilani and Government Engineering College, Chandigarh, have been selected for being converted into large units. M.B.M. Engineering College, Jodhpur will also be expanded for the Civil Engineering course. When this expansion takes place, each institute will have a student-enrolment ranging from 800 to 1000. It is also proposed that a Tele-communication Engineering Degree course should be started in Roorkee University and Birla Engineering College, Pilani.

3.32 The present intake capacity of the institutions, the proposed intake capacity and the additional seats available are as follows :—

Institute	Present sanctioned admission capacity	Proposed addmission capacity	Additional seats available
Roorkee University	80	270	190
Engineering College, Banaras Hindu University	160	270	110
M.B.M. Engineering College, Jodhpur	35	110	75
Birla Engineering College, Pilani	150	240	90
Government Engineering College, Chandigarh	75	240	165

3.33 The details of the course-wise or subject wise distribution of the above seats are given in Annexure—II. When the above expansion takes place the existing institutions will provide 630 additional seats for the Degree courses.

3.34 No new Engineering college is proposed for this region at this stage. It is, however, suggested that depending upon the decision to be taken regarding the location of the Northern Higher Technological Institute, the establishment of an Engineering college in Delhi may be considered, at a later stage. It is desirable that an important and central place like Delhi should have a Technical college to which the Degree courses conducted at present in the Delhi Polytechnic might be transferred and the Polytechnic developed for other types of Technical education, which are equally-important and needed.

Diploma Courses :

3.35 For the Diploma courses, it is proposed that 1265 additional seats may be provided by expanding (a) seven Polytechnics in Uttar Pradesh so as to yield 700 additional seats ; (a) seven Polytechnics in Punjab so as to yield 460 additional seats ; and (c) one Polytechnic in Rajasthan so as to yield 105 additional seats.

3.36 In addition to the above expansion, it is proposed that five Polytechnics should be established in the region—two in U.P., two in Punjab and one in Rajasthan, each with an intake of 240 students. The exact location of the Polytechnics should be left the State Governments concerned to decide in consultation with the Northern Regional Committee.

3.4 Southern Region

Degree Courses :

3.41 Four Colleges, viz., Guindy Engineering College, Madras, Engineering College, Osmania University, Hyderabad, Government Engineering College, Bangalore and College of Engineering, Travancore University, Trivandrum, have been selected for being converted into larger units. When this expansion takes place, each institute will have a student-enrolment ranging from 800 to 1000.

3.42 The present intake capacity of the institutions, the proposed intake capacity and the additional seats available are as follows :—

Institute	Present sanctioned admission capacity	Proposed admission capacity	Additional seats available
Guindy Engineering College, Madras.	110	250	140
Engineering College, Osmania University.	90	230	140
Government Engineering College, Bangalore.	120	210	90
College of Engineering, Travancore University.	100	210	110

3.43 The details of the course-wise or subject-wise distribution of the above seats are given in Annexure-II. When this expansion takes place 480 additional seats will be available for the Degree courses.

3.44 No new Engineering college is proposed for the region at this stage.

Diploma Courses :

3.45 For the Diploma courses, it is proposed that 960 additional seats may be provided by expanding (a) three Polytechnics in Madras State so as to yield 230 additional seats ; (b) two Polytechnics in Mysore State so as to yield 160 additional seats ; (c) three Polytechnics in Andhra State so as to yield 250 additional seats ; and (d) two Polytechnics in Kerala State so as to yield 270 additional seats.

3.46 In addition to the above expansion, it is proposed that four Polytechnics should be established in the region—one in Madras State ; one in Mysore State ; one in Andhra State and one in Kerala State, each with an intake capacity of 120 students (60 for Civil, 30 for Mechanical and 30 for Electrical).

4. *Summary of Proposals*

4.1. To sum up the above proposals for the expansion of the existing institutions and establishment of new institutions, the additional seats available for Degree and Diploma courses in Engineering in the different regions will be as follows :—

Region	No. of additional seats available					
	Degree courses			Diploma courses		
	Expansion	New Institution	Total	Expansion	New Institutions	Total
Eastern	728	400	1128	1550	1620	3170
Western	700	120	820	450	1380	1830
Northern	630	—	630	1265	1200	2465
Southern	480	—	480	960	480	1440
Total ...	2538	520	3058	4225	4680	8905

4.2. It will be observed that the number of additional seats available will be slightly greater than what 18 Engineering colleges and 62 Polytechnics recommended by the Engineering Personnel Committee would have provided by 264 seats for Degree courses and 684 seats for Diploma courses. It is both necessary and practicable to plan for this expansion of Technical education so as to allow sufficient margin for meeting the yet undetermined requirement for Technical personnel in the third plan period.

5. *Method of Implementation*

5.1. The proposed expansion of existing institutions should be carried out with great care and speed, keeping, however, foremost in view the maintenance of highest standard of instruction.

The quality of education which is not already very high in many institutions should not be allowed to deteriorate further for the sake of a mere numerical increase in student-enrolment ; and this should be ensured by maintaining a proper teacher-student ratio throughout. The additional instructional facilities required—equipment, accommodation etc., should be carefully assessed and provided having regard to the maximum possible utilisation of the existing facilities. We are of opinion that the work in these Technical institutions should begin from 8 A.M. and continue till 5 P.M. and that workshop and laboratory non-gazetted non-teaching Technical staff should work, as in factories, 45 hours a week ; and that, as far as possible, students should be given practical training in workshops and laboratories in two shifts per day to meet the emergent situation that has arisen. It has to be remembered that due to limited availability of foreign exchange for buying scientific and Technical equipment from abroad for educational purposes, the maximum use should be made of such equipment as are available. For maintaining the proper teacher-student ratio, the required additional staff should not be restricted to junior posts but should be spread over all the grades of teachers, both senior and junior, in an equitable manner Otherwise, the danger will be a decline in the standards due to lack of adequate senior teachers.

6.2. Each institution should be asked to prepare in consultation with the concerned Regional Committee of the All-India Council for Technical Education a phased programme of the expansion indicating clearly the manner in which the required additional instructional facilities will be provided, the details of the staff requirements and and how they will be met ; the reorganisation of the administrative machinery for the speedy execution of the development plan and exercise of effective control over the standards of teaching etc. It is hoped that it will not take long for the central Government to sanction such fully worked out schemes. The progress of the scheme should be carefully watched by the Regional Committees for which purpose they should evolve proper procedures and set up adequate machinery.

6.3. For the expeditious establishment and development of the three new Engineering colleges—two in the Eastern Region and one in the Western Region recommended in this report and for their

efficient administration, a board of governors of managing committee should be set up for each college which should be fully autonomous and vested with the necessary powers. Experience with the Indian Institute of Technology, Kharagpur and other institutions has shown that an administrative authority, entirely different from the traditional departmental control of government and free from red-tapism and procedural bottlenecks is absolutely necessary for the execution of Technical education projects. It is suggested that the board of governors of each new college be so constituted that it is fully representative of all interests concerned viz., Central and State Government, the Engineering profession, industry and the general public. The details should be settled in consultation with the All-India Council for Technical Education and its Regional Committee.

6.4. The development of Technical education in the country should be regarded as a national problem and tackled as such in a coordinated manner. For this purpose, an all-India organisation with regional aims is necessary. Fortunately, such a machinery is readily available in the All-India Council for Technical Education and its Regional Committees, which have laid a firm foundation for the reorganisation and development of Technical education in the country. The progress of the efforts of the All-India Council will, however, depend upon the administrative and Technical personnel available for carrying out its programmes and policies. Such personnel are all the more needed in view of the large-scale expansion contemplated in this report, which has to be ensured through the Regional Committees. The staff in charge of the regional offices of the Ministry being inadequate, it it necessary that two senior Technical officers of the rank of Deputy Educational Advisers should be appointed immediately by the Central Government. One of these officers should be in charge of the work of the Eastern and Northern Regions and another of the Western and Southern Regions.

6. *Degree Courses versus Diploma Courses in the same Institution*

6.1. The development of Technical education in the country reveals the following important features :—

(a) An Engineering College conducting Degree courses also conducts Diploma courses and the instructional facilities—equipment, buildings, staff, are common to both sets of courses.

(b) Where an Engineering college has a Polytechnic attached to it the two sets of courses form separate entities and the instructional facilities are also largely separate. The

laboratories, workshops and staff are, however, to some extent common.

6.2. When an institution falling under category (a) above is selected for conversion into a large unit for the Degree courses with an enrolment of 800 to 1000 students, it is not desirable from the practical point of view that it should continue the Diploma courses. The principle of conversion into large units involves the maximum possible use of instructional facilities and as such, there is little scope of the facilities being also available for the Diploma courses. Apart from this practical consideration, there will always be difficulties of adjustment between the Degree and Diploma courses in an ideological sense. In these circumstances, the Diploma courses of that institution should be separated completely from the Degree courses and located in a separate Polytechnic to be established for the purpose.

6.3. Institutions falling under category (b) should not normally be considered for any large scale expansion but for either of the two courses, but the training capacity may be increased within certain limits provided it does not involve a large measure of common services and facilities between the two sets of courses.

6.4. Four Engineering colleges viz., Bihar Institute of Technology, Sindri, Poona Engineering College, L.D. College of Engineering, Baroda University which have been selected for conversion into large units for the Degree courses are also conducting Diploma courses at present. As the expansion programme is taken in hand the Diploma courses should be transferred from these institutions to separate Polytechnics. For this purpose, it is proposed that four new Polytechnics should be established—one in Dhanbad, one in Poona, one in Ahmedabad and one in Baroda with an admission capacity of 240-300 students each.

7. *Private Enterprise For Technical Education*

Private enterprise has played a very important role in the development of Technical education in the country. Every encouragement and opportunity should be provided to private enterprise wherever available to continue to take the same interest in Technical education and even to play a much larger role than at present. There is no gainsaying the fact that in due course Technical education will have to be expanded on a much larger scale than envisaged in this note or in the report of the Engineering Personnel Committee and the offer of private enterprise should only be regarded as supplementary to efforts of the State and the Central Governments and not as

supplanting them. As and when private enterprise comes forth to establish a college or Polytechnic and seeks assistance from the Central Government or the State Government, that should be considered on its own merits as a part of the normal process of development for which the five-year plans include the necessary provision. This is a matter to be considered by the Regional and the All-India Council from time to time as new private enterprise comes forth. However, for new institutions proposed for establishment in this report, if any offer of private enterprise and resources is available that should be taken full advantage of.

8. *Teachers' Training*

8.1 The crux of the problem of Technical education is teachers, whether for the expansion of existing institutions or for the establishment of new institutions ; the supply of well qualified and experienced staff is a *sine que non*. There is at present an acute shortage of teachers for Technical institutions. Unless urgent and far-reaching measures are taken to remedy this position all efforts towards the development of Technical education in the country will fail.

8.2. A constant and adequate supply of teachers is only possible by initiating and developing on a large scale a programme of training of Technical personnel for teaching positions and attracting brilliant young men qualifying from universities and other institutions to this training. For this purpose, a number of Senior and Junior Fellowships should be created in selected existing institutions to be awarded to promising men, who should be apprenticed to Professors and other senior teachers for stated periods, say three years. During this period, they should participate in the teaching work of the institutions concerned and acquire the necessary experience. They should be encouraged to do research for which adequate facilities should be provided. It is, however, desirable that they should spend at least six months in industry to broaden their outlook and practical experience. On completion of the apprenticeship, they should form a pool from which all Technical institutions may recruit teachers to meet their normal and developmental requirements. After every three years the Fellowships should be reawarded to fresh candidates ensuring, however, that a certain number of Fellowships are available for award every year.

8.3. The Fellowships should be of a value which will attract the most talented of our young graduates to teaching work in preference to other types of professional work in industry or government departments. For Senior Fellowships to be created in colleges doing work

of at least First Degree standard the value should be Rs. 325-25-400; and for Junior Fellowships to be created in Polytechnics of Diploma standard it should be Rs. 250-25-300.

8.4. Having regard to the fact that in the course of the next 3-4 years a large number of teachers will be required, it is proposed that 50 Senior Fellowships and 100 Junior Fellowships should be created in the first year of the programme. In the subsequent years, the number should be so adjusted that 25 Senior and 50 Junior Fellowships will be available for award every year.

8.5. The selections for the Fellowships should be made on an all-India basis with merit as the sole criterion. The selected candidates should give an undertaking to complete the full three year period of Fellowship.

8.6. It is important to ensure that the persons who have completed the training will be suitably employed. For this purpose, all institutions which have been selected for expansion as well as the new ones to be established should agree to recruit as many of their sfaff as possible.

8.7. The total cost of the scheme will be as follows :—

First year :	Rs. 5.1 lakhs
Second year :	Rs. 8.1 lakhs
Third year :	Rs. 11.325 lakhs

8.8. As and when the teachers' training facilities improve and the demand for trained personnel increase the number of Fellowships should be increased.

9. *Teachers' Salary*

9.1. One of the main reasons for the shortage of staff in Technical institutions is the poor salary paid to teachers, as compared to Technical personnel in industry, government departments and other organisations. With large-scale industrial development and governmental activity in progress which require Technical personnel in great numbers, not only are the institutions finding it extremely difficult to attract well-qualified and experienced persons to teaching positions but even the existing teachers are leaving the institutions for good positions elsewhere. This problem unless tackled with urgency and realism will soon assume serious proportions and all schemes of expansion of Technical education will fail.

9.2. It is understood that the All-India Council for Technical Education and University Grants Commission have appointed a Joint Committee to consider the problem of salary of teachers of Technical institutions and suggest the required improvements. Pend-

ing the recommendations of the committee it is necessary to adopt certain interim measures which will ease the existing difficult situation and facilitate the successful implementation of the expansion schemes proposed in this report. It is suggested that in all the institutions which have been selected for the expansion of the training capacity the salary scales of the staff should be revised immediately as follows:—

(*a*) *Engineering Colleges:*	
(i) Principal	The scale should be the same as for the Additional Chief Engineer or equivalent post in the concerned State Government.
(ii) Head of Department; Professor	The scale should be the same as for the Superintending Engineer.
(iii) Assistant Professor ; Reader	The scale should be the same as for the Executive Engineer.
(iv) Lecturer	The scale should be the same as for the Assistant Engineer.
(*b*) *Polytechnics* :	
(i) Principal	The scale should be the same as for the Executive Engineer.
(ii) Head of Deptt.	The Principal should, however, get a special allowance of about Rs. 200/- p.m.
(iii) Lecturer :	Same as for Assistant Engineers.

In the rest of the Technical institutions also it is necessary to bring about improvements on the above lines, as far as possible.

10. *Financial Estimates*

10.1. In making the financial estimates for the expansion of the existing institutions as outlined in this report, various factors, viz. the total work-load on the existing workshops and laboratories, duration of occupancy of the classrooms and drawing halls, teacher-student ratio etc. in each case should be taken into consideration, so that the maximum possible use of the available instructional facilities may be ensured. As the institutions are working at present on the single shift batch system, the laboratories and workshops, drawing halls and class rooms are generally not occupied for more than 60 per cent of the time available each working day. However, by adopting the double shift continuous system and eight-hour working day it should be possible to cater for a larger student body resulting from increased admissions without any large scale additions to the existing instructional facilities. The additions should not generally exceed 50% of the facilities otherwise required if a new institution were started for

the extra students. Where, however, new courses are proposed to be started in an existing institution and for that purpose separate departments have to be established the required instructional facilities have to be created *de novo*. Even in these cases, economies are possible in view of the fact that the first two years of the new courses are largely common with the existing courses and only for the last two years are the specialised facilities appropriate to the Subjects concerned required.

10.2 The above principle of continuous process and the shift system will apply equally to new institutions to be established with large admission capacities ranging from 250-300 students/year. In these cases, the capital outlay for buildings and equipment should be considerably less than for an otherwise larger number of institutions with smaller admission capacities.

10.3. The success of the expansion programme will depend upon the maintenance of proper standards of instruction. This can only be ensured by keeping the same teacher-student ratio after expansion as before. The additional staff required on this basis should be determined for all grades of teaching posts but no additional posts of Professors Heads of Departments should normally be sanctioned.

10.4. Full hostel accommodation has to be provided in the case of all institutions which are residential. For the rest, the hostel accommodation should be for up to 50 per cent. of the additional students. In this respect the normal policy laid down by the All-India Council for Technical Education should be followed. It is, however, important that in view of the existing shortage of cement and steel multi-storeyed structures for hostels should be allowed only in metropolitan areas where the cost of land is very high ; and in other areas the hostels should be simple structures, using traditional building materials. For Polytechnics, the dormitary type of accommodation may be provided in the hostels, as far as possible.

10.5. The details of the financial estimates for each institution on the basis of the above considerations should be worked out by the concerned Regional Committee. At this stage, only certain ceilings in respect of per capita cost may be laid down, within which the Regional Committees should work out the final estimates of cost. After a discussion with the principals of selected institutions, the following ceilings are suggested.

Expansion of Existing Institutions :

(*a*) *Degree Courses*

Accommodation : 100 sq. ft. student for extensions to

existing courses and 200 sq. ft. for new courses.

Equipment : Rs. 1,200/- students for extensions to existing courses. For the new courses, Rs. 3,500/- for all subjects excepting Telecommunication Engineering for which the rate should be Rs. 5,000/-

Fittings & fixtures : Rs. 100/- student.

Recurring : Rs. 1000/- student for extensions to existing courses and Rs. 1200/- student for new courses.

Hostels : The rate varies from place to place but an average of Rs. 2,800/- student may be prescribed.

(b) *Diploma Courses*

Accommodation : 70 sq. ft./student for extensions to existing courses and 150 sq. ft. for new courses.

Equipment : Rs. 750/- student for extensions to existing courses and Rs. 2500/- for new courses.

Recurring : Rs. 500/- student for extensions to existing courses and Rs. 700/- student for new courses.

Hostels : The rate will depend upon the type of accommodaton provided in each area.

The above ceilings in respect of extensions to existing courses are primarily based on the consideration that the laboratories, workshops, drawing halls and classrooms are used throughout the eight-hour day, in shifts by groups of students.

For new institutions—Engineering colleges and Polytechnics recommended for establishment, the standards prescribed by the All-India Council for Technical Education should be adopted, These standards are, however, for smaller Unit Sizes of institutions viz,, intake of 120 students and as such, have to be projected for larger Unit Sizes keeping in view the full utilization of the facilities on the basis of the shift system.

It is estimated that by generally adopting the above ceilings the total cost of the scheme of expansion of the existing institutions and and establishment of new institutions will be of the following order :—

Non-recurring : Rs. 1200 lakhs

Recurring :	Rs. 300 lakhs maximum
Interest free loans for Hostels	Rs. 500 lakhs

The final estimates for each institution will have to be determined by the Regional Committee concerned after examining the necessary details.

It may be pointed out that by investing about Rs. 1200 lakhs on buildings and equipment not only will the provision of facilities for Degree and Diploma courses increase by 3060 and 8910 seats respectively in the current plan period but a larger training potential will be generated which can be utilized in the third and subsequent plan periods. In that respect the financial proposals made in this report are an investment for the future also when with small additions to the institutions, the training capacity can be further increased.

Sd/- J.C. Ghosh.
17-1-57.

Sd/- L.S. Chandrakant.
17-1-57.

ANNEXURE—I

Number of Additional Seats to be Provided According to the Recommendations of the Engineering Personnel Committee

Region	No. of Seats for Degree Courses					No. of Seats for Diploma Courses					Remarks
	Civil	Mecha-nical	Elec-trical	Tele-commu-nication	Total	Civil	Mecha-nical	Elec-trical	Tele-commu-nication	Total	
Eastern Region	428	243	239	160	1070	1783	922	517	—	3222	
Western Region	358	173	148	44	723	1100	287	229	22	1638	
Northern Region	340	91	101	50	582	675	760	760	—	2195	
Southern Region	174	97	103	45	419	340	330	436	60	1166	
Total	1300	604	591	299	2794	3898	2299	1942	82	8221	

ANNEXURE—II

Summary of Course-wise Distribution of Additional Seats to be provided in accordance with the Proposals made in the Report

Region	DEGREE					DIPLOMA				
	Civil	Mech.	Elec.	Tele.	Total	Civil	Mech.	Elec.	Tele.	Total
Eastern	510	244	264	110	1128	1950	610	610	...	3170
Western	405	205	170	40	820	1090	370	370	...	1830
Northern	340	115	115	60	630	815	806	844	...	2465
Southern	170	130	140	40	480	520	385	475	60	1440
Grand Total :	1425	694	689	250	3058	4375	2171	2299	60	8905

Statement of Population & Present Provision & Expected Provision by 1960-61 for Technical Education in each Region—(Basic Engineering viz., Civil, Mechanical, Electrical and Electrical Communication Subjects)

Region	Population (in millions)	Present Provision (Intake in 1956)		Expected Provision in 1960-61*	
		Degree Courses	Diploma Courses	Degree Courses	Diploma Courses
Eastern Region	93.26	950	1440	2260	4660
Western Region	78.02	1270	2300	2270	4480
Northern Region	106.27	880	2080	1910	4815
Southern Region	99.06	1880	3050	2240	4780
Total	376.61	4980	8870	8680	18735

(*includes (a) Three Higher Technological institutes & Engineering colleges & Polytechnics already provided for in the Second Plan and

(b) Proposals made in the report for the implementation of the recommendations of the Engineering Personnel Committee).

ANNEXURE II

EASTERN REGION

Additional Seats for Degree Courses

S. No.	Name of Institutions	Present sanctioned Intake				Proposed Intake				Increase				Remarks
		Civil	Mech.	Elec.	Tele.	Civil.	Mech.	Elec.	Tele.	Civil	Mech.	Elec.	Tele.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	A—Expansion of Existing Institutions													
1	Bengal Engineering College, Sibpur, West Bengal.	80	30	30	...	160	60	60	40	80	30	30	40	The College should start degree course in Tele-communication.
2	College of Engineering and Technology, Jadavpur University, West Bengal.	60*	80	60	...	90	90	90	40	90	10	30	40	The College should start Degree course in Tele-communication. *The College has just been approved for Civil Engineering Degree course with an admission of 60 students per year. Necessary grants have also been approved for the purpose.
3	Bihar Institute of Technology, Sindri, Bihar.	...	40*	40*	...	90	60	60	30	90	30	30	30	(a) The College should start Degree course in Tele-communication.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
														(b) The College should stop conducting Diploma courses. The Diploma courses should be transferred to a separate Polytechnic which may be established preferably in Dhanbad.
4	Birla Institute of Technology, Ranchi, Bihar.	...	66	66	...	90	90	90	...	90	24	24	...	*Includes 10 additional seats sanctioned recently.
5	Assam Engineering College, Gauhati, Assam.	60	...	...	...	60	30	30	...	...	30	30	...	
							Total		...	350	124	144	180	
	B—Establishment of New Institutions													
1	One New Engineering College in Durgapur area, West Bengal.	...	...	...	...	80	60	60	...	80	60	60	...	
2	One New Engineering College in Tatanagar area, Bihar.	...	...	...	...	80	60	60	...	80	60	60	...	
							Total		...	160	120	120	...	
										350	124	144	110	
							Grand Total		...	510	244	264	110	
						Total number of Additional Seats			...	1128				

WESTERN REGION

Additional Seats for Degree Courses

S. No.	Name of College	Present admissions				Admission proposed				Increase				Remarks
		Civil	Mech.	Elec.	Tele.	Civil	Mech.	Elec.	Tele.	Civil.	Mech.	Elec.	Tele.	
	A—Expansion of Existing Institutions													
1	College of Engineering, Poona.	80	25	25	10	120	60	60	40	40	35	35	30	The College should discontinue the Diploma courses. The diploma courses, should be transferred to a new Polytechnic to be established in Poona.
2	L.D. College of Engineering, Ahmedabad.	50	25	25	...	150	90	60	...	100	65	35	...	The College should discontinue the Diploma courses. The Diploma courses should be transferred to a new Polytechnic to be established in Ahmedabad.
3	Faculty of Technology, Baroda University, Baroda.	25	25	25	...	120	60	60	...	95	35	35	...	The College should discontinue the Diploma courses. The Diploma courses should be transferred to a new Polytechnic to be established in Baroda.
4	Victoria Jubilee Technical Institute, Matunga, Bombay.	50	30	30	...	70	35	35	...	20	5	5	...	
5	Government Engineeting College Jabalpur.	30	25	30	30	120	60	60	40	90	35	30	10	
								Total	...	345	175	140	40	
	B—Establishment of New Institutions													
1	New Government Engineering College, Nagpur (already started)	...	...	...	...	60	30	30	...	60	30	30	...	This new college established by the State Govt. started functioning this year. This is not included in the State Second Five-year plan.
								Grand Total		405	205	170	40	

Total increase.....820

NORTHERN REGION

Additional Seats For Degree Courses

Serial No.	Civil Name of institution	Present sanctioned Intake				Proposed Intake				Increase				Remarks
		Civil	Mech.	Elec.	Tele.	Civil	Mech.	Elec.	Tele.	Civil	Mech.	Elec.	Tele.	
	Expansion of existing Institutions													
1	Engineering College, Banaras Hindu University, Banaras.	40	60	60	—	120	75	75	—	80	15	15	—	
2	Roorkee University, Roorkee.	40	20	20	—	120	60	60	30	80	40	40	30	New course in Telecommunication with an intake of 30 should be started.
3	Punjab Engineering College, Chandigarh.	45	15	15	—	120	60	60	—	75	45	45	—	
4	Birla College of Engineering, Pilani.	—	75	75	—	30	90	90	30	30	15	15	30	New course in Telecommunication Engineering with an intake of 30 should be started.
5	M.B.M. Engineering College, Jodhpur.	35	—	—	—	110	—	—	—	75	—	—	—	
								Total		340	115	115	60	

Total Increase.....630.

Note :—The provision of Civil Engineering Degree course in the Delhi Polytechnic with 40 seats is not taken into account here at the course started in 1955 and the development of the institution has been included in the Second Five-Year plan.

SOUTHERN REGION

Additional Seats For Degree Courses

Serial No.	Name of Institution	Present sanctioned Intake				Proposed Intake				Increase				Remarks
		Civil.	Mech.	Elec.	Tele.	Civil.	Mech.	Elec.	Tele.	Civil	Mech.	Elec.	Tele.	
	Expansion of Existing Institutions													
1	Guindy Engineering College, Madras.	50*	30*	30*	20	90	60	60	40	50	35	35	20	* Includes 20 additional seats recently sanctioned.
2	Engineering College, Osmenia University, Hyderabad.	50	25*	25*	—	90	60	60	20	40	40	40	20	* Includes 10 additional seats recently sanctioned. The University should start a Degree course in Tele-communication Engineering.
3	Government Engineering College, Bangalore.	50	40	30	—	90	60	60	—	40	20	30	—	
4	College of Engineering, Travancore University.	50	25	25	—	90	60	60	—	40	35	35	—	
								Total		170	130	140	40	

EASTERN REGION

Additional Seats For Diploma Courses

Serial No.	Name of Institutions	Present Intake			Propose d Intake			Increase			Remarks
		Civil	Mech.	Elec.	Civil	Mech.	Elec.	Civil	Mech.	Elec.	
1	2	3	4	5	6	7	8	9	10	11	12
	A—EXPANSION OF EXISTING INSTITUTIONS										
1	R.K. Mission Silpa Mandira, Belur, West Bengal.	60	15	15	120	30	30	60	15	15	
2	Jadavpur Polytechnic, Jadavpur, West Bengal.	120	15	15	120	30	30	—	15	15	
3	M.B.C. Institute of Engineering and Technology, Burdwan, West Bengal.	60	15	15	120	30	30	60	15	15	
4	Hooghly Institute of Technology, Hooghly, West Bengal.	60	—	—	120	30	30	60	30	30	
5	K.G. Engineering Institute, Vishnupur, West Bengal.	60	—	—	120	30	30	60	30	30	
6	Jalpaiguri Polytechnic, Jalpaiguri, West Bengal.	60	—	—	120	30	30	60	30	30	
7	R.K. Shilpa Vidyapith, Suri, West Bengal.	60	—	—	120	30	30	60	30	30	
8	Bipradas Palchoudhury Institute, Krishnagar, West Bengal.	60	—	—	120	30	30	60	30	30	
9	Ranchi School of Civil Engineering, Bihar.	60	—	—	120	30	30	60	30	30	
10	Bhagalpur School of Civil Engineering, Bihar,	60	—	—	120	30	30	60	30	30	
11	Orissa School of Engineering, Cuttack, Orissa.	90	15	15	120	30	30	30	15	15	
12	Jharsuguda School of Mech. & Elec. Engineering, Jharsuguda, Orissa.	—	30	30	120	30	30	120	—	—	
13	Behrampore, Civil Engineering School, Behrampore, Orissa.	60	—	—	120	30	30	60	30	30	
14	H.R.H. The Prince of Wales Institute of Engineering & Technology, Jorhat, Assam.	—	20	20	120	30	30	120	10	10	

1	2	3	4	5	6	7	8	9	10	11	
15	Assam Civil Engineering Institute, Gauhati, Assam.	120	—	—	120	30	30	—	30	30	
						Total		870	340	340	
	B-ESTABLISHMENT OF NEW INSTITUTIONS										
1	New Polytechnic in Dhanbad, Bihar	—	30*	30*	120	60	60	120	30	30	This new institution should be established preferably in Dhanbad and to this, the Diploma courses at present conducted in the Sindhri Engineering School, which is part of the Bihar Institute of Technology, should be transferred. *There are the admission made at present in the Bihar Institute of Technology.
2-5	Four New Polytechnics, West Bengal.	—	—	—	480	120	120	480	120	120	
6-7	Two New Polytechnics, Bihar.	—	—	—	240	60	60	240	60	60	
8	One New Polytechnic, Orissa.	—	—	—	120	30	30	120	30	30	
9	One New Polytechnic, Assam.	—	—	—	120	30	30	120	30	30	
			Total		1080	300	300	1080	270	270	
								870	340	340	
			Grand Total					1950	610	610	

Total addition seats.....3170

Note : 2 to 9—Each with an intake of :—Civil.....120
Mechanical..... 30
Electrical..... 30
Total..... 180

WESTERN REGION

Additional Seats For Diploma Courses

S. No.	Name of Institutions	Present Intake			Proposed Intake			Increase			Remarks
		Civil	Mech.	Elec.	Civil	Mech.	Elec.	Civil	Mech.	Elec.	
1	2	3	4	5	6	7	8	9	10	11	12
A-Expansion of Existing Institutions											
1	Government Polytechnic, Jabalpur.	60	30	30	120	60	60	60	30	30	
2	Vallabhbhai Polytechnic Institute, Bhopal.	60	20	20	90	60	60	30	40	40	
3	Govindaram Seksaria Technical Institute, Indore.	60	15	15	90	30	30	30	15	15	
4	Victoria Jubilee Technical Institute, Bombay.	—	40	40	60	40	40	60	—	—	The Institute wishes to start civil Engineering Course in place of the existing Sanitary Engineering Course
5	Walchand College of Engineering, Sangli.	40	20	20	60	30	30	20	10	10	
6	Sir Cusrow Wadia Institute of Electrical Technology, Poona.	—	—	60	60	—	60	60	—	—	
					Total			260	95	95	

1	2	3	4	5	6	7	8	9	10	11	12
B—*Establishment of New Institutions.*											
1.	New Government Polytechnic in Poona.	80*	30*	30	180	60	60	100	30	30	The new Polytechnic should take over the existing Diploma courses from the Engineering College, Poona.
2.	New Government Polytechnic in Ahmedabad.	50*	25*	25*	180	60	60	130	35	35	This new Polytechnic should take over the existing diploma courses from L.D. College of Engineering, Ahmedabad.
3.	New University Polytechnic, Baroda University.	60*	60*	60*	180	60	60	120	—	—	This new Polytechnic should take over the existing Diploma courses from Faculty of Tech.
	(*There are the admissions now being made in the three Engineering Colleges which conduct degree courses).										
4.	New Government Polytechnic in Bombay.	—	—	—	180	60	60	180	60	60	
5.	New Polytechnic in Bhilsa.	—	—	—	60	30	30	60	30	30	The new Polytechnic which is not in the State plan has just been established by the State.
6-8.	Three new Polytechnics for Bombay State, (The locating of which to be decided by the State Government).	—	—	—	160	90	90	180	90	90	As it is understood that private enterprise has definitely come forth for the establishment of some Polytechnics in the different parts of State, it is suggested that this may be taken into account in the establishment of three their Polytechnics suggested here.
9.	One new Polytechnic for Madhya Pradesh (The locating of which to be decided by the State Government.)	—	—	—	60	30	30	60	30	30	
					Total	...		830	275	275	

Total No. of additional seats.....1830

NORTHERN REGION

Additional Seats for Diploma Courses

S. No.	Name of Institution	Present sanctioned Intake			Proposed Intake			Increase			REMARKS.
		Civil	Mech.	Elec.	Civil	Mech.	Elec.	Civil	Mech	Elec.	
	A—*Expansion of Existing Institutions*										
1.	Roorkee University, Roorkee.	100	20	20	120	60	60	20	40	40	
2.	University Polytechnic, Muslim University, Aligarh.	40	25	25	120	60	60	80	35	35	
3.	Govt. Technical Institute, Lucknow.	—	20	20	60	60	60	60	40	40	
4.	I.D. Technical Institute, Bahjoi.	—	20	20	30	30	30	30	10	10	
5.	Technical College, Dayal Bagh, Agra.	—	22	23	60	30	30	60	8	7	
6.	Govt. Technical Institute, Gorakhpur.	—	17	18	60	60	60	60	43	42	
7.	P.M.V. Engineering College, Mathura.	—	40	—	—	40	40	—	—	40	
8.	Nilokheri Polytechnic & Government School of Engineering, Nilokheri.	80	30	30	90	60	60	20	30	30	
9.	Mehr Chand Technical Institute, Jullundur.	50	30	30	60	30	30	10	—	—	
10.	Guru Nanak Engineering College, Ludhiana.	50	20	20	70	25	25	20	5	5	
11.	Govt. Technical Institute, Ambala.	—	30	30	90	60	60	90	30	30	
12.	Govt. Central Polytechnic, Chandigarh.	90	30	30	120	60	60	30	30	30	
13.	Tapar Instt. of Engg. & Tech., Patiala.	60	30	30	90	60	60	30	30	30	
14.	Vishwakarma Polytechnic, Bhagwara.	100	20	20	100	30	30	—	10	10	
15.	M.B.M. Engineering College, Jodhpur.	75	15	15	90	60	60	15	45	45	
						Total		515	356	394	
	B—*Establishment of five New Polytechnics*										
	Two in U.P., two in Punjab & one in Rajasthan.	—	—	—	300	450	450	300	450	450	
						Grand Total ..		815	806	844	

Total increase 2465

SOUTHERN REGION

Additional Seats for Diploma Courses

S. No.	Name of Institution	Present sanctioned Intake				Proposed Intake				Increase				REMARKS.
		Civil	Mech.	Elec.	Tele.	Civil	Mech.	Elec.	Tele	Civil	Mech.	Elec.	Tele	
	A-Expansion of Existing Institutions.													
1	Andhra Polytechnic, Kakinada.	60	30	30	—	60	60	60	—	—	30	30	—	
2	Government Polytechnic, Visagapatam.	50	25	25	—	60	60	60	—	10	35	35	—	
3	Government Technical College, Hyderabad.	50	30	50	—	90	60	60	30	40	30	10	30	
4	Government Polytechnic, Coimbatore.	—	—	—	20	60	30	60	40	60	30	60	20	
	Tamilnad Polytechnic, Mathurai.	60	30	30	—	60	60	60	—	—	30	30	—	
6	Central Polytechnic, Madras.	80	40	40	—	90	60	60	—	10	20	20	—	
	Government Polytechnic, Kozhikode,	—	—	—	—	60	30	30	—	60	30	30	—	
	Government Polytechnic, Kalamassery.	—	—	—	—	60	30	60	—	60	30	60	—	
9	Karnataka Polytechnic, Mangalore.	40	20	—	—	60	30	60	—	20	10	60	—	
10	S.J. Occupational Institute, Bangalore.	40	40	40	30	60	60	60	40	20	20	20	10	
								Total		280	265	355	60	
	B-Establishment of New Institutions. Four Polytechnics one each for Madras, Mysore, Kerala & Andhra States. Intake : Civil 60, Mechanical 30 and Electrical 30.	—	—	—	—	240	120	120	—	240	120	120	—	
								Grand Total ..		520	385	475	60	

APPENDIX "D"

Training of Foremen and Supervisors for the Mechanical Engineering Industry

Scheme for a Five-Year Sandwich course for National Certificate in Mechanical Engineering

1. *Place of Foreman in Industry*

1.1. In industry today, the Foreman occupies a key position, as he is the leader of a primary working group of craftsmen and responsible for their production. He can only fill this role adequately if he possesses two essentials, viz., knowledge about his industry and practical experience. These two qualities are complementary and and one without the other is of limited value. The performance of a Foreman entirely depends upon the extent to which he blends theory with practice and develops himself further on this basis. It is a process which extends over several years and at every stage he becomes a better Foreman. If he relied solely on 'practical experience' and despised theory and cast general knowledge aside, he is denying himself the whole wealth of human experience, which he can only reach through books and study. He becomes static.

> "To theory, sooner or later, the subtlest craftsman has to bow his head. For, even while his hand is on his tools, by theory new circumstances and contingencies are being envisaged and dealt with and processes shortened and economised."

In short, practical apprenticeship by itself is a wasteful and unsatisfactory form of training. Properly reinforced by theoretical study it is infinitely more productive.

1.2. The Foreman has also been described as the 'Sargeant Major of Industry', 'the man who is in the first rung of the management ladder'. His position as a junior executive calls for a thorough working knowledge of the processes and operations committed to his charge but also of the firm of whose organisation he is a part. He is in daily contact with the Production Engineers, the Production Controllers, the Estimators, the Rate Officers, Time and Motion Study Engineers, with the Personnel, Wages and Costs Departments and a host of others. If he is to cooperate fully and intelligently

with these experts—and this should be his aim—he must know something of their organisation and methods and why and how they can be of some service to himself and he to them. He should be assisted to acquire this knowledge not in the hard way by a process of trial and error but by organised training under the guidance of qualified teachers who will give him the general principles of works organisation and labour management as well as develop his capacity to work through the problems he meets with from day to day. Such training is not an alternative to specified technical knowledge and skill. It is an essential condition. It is no substitute for character and qualities of leadership, but will indicate how best these qualities can be developed and used for the successful accomplishment of a vital task.

2. *Present System of Training*

2.1. The present methods of training and recruitment of persons as Foremen and Supervisors for industry are far from statisfactory. In some factories the Foremen are drawn from the ranks of skilled workers who possess long years of service and practical experience. It is indeed a healthy principle to give every incentive and encouragement to workers to rise to Supervisory positions. The defect, however, is that such persons when they occupy higher positions are not equipped with the necessary technical knowledge about their industry. This lacuna is usually made up in other countries by providing facilities for part-time day and evening courses in Technical institutions for the workers. There is a rich diversity of such courses and in the United Kingdom, for instance, for every full-time Technical student there are over 30 part-time students. In India, however, the provision for part-time courses for workers in employments are due to historical and other circumstances woefully inadequate, if not totally absent It will indeed be a long time before a good net-work of these facilities could be built up covering every important industrial centre. It will also take some time to develop in the workers themselves an active interest in the courses. That many of them do not have sufficient general educational attainment necessary for taking full advantage of part-time courses also makes the task difficult. Further, the management of industry —both State and private—will have to be persuaded to grant part-time day release and other facilities to such of their workers who wish to join the courses. All these difficulties will have to and should be overcome in the larger interests of the industrial development of the country and efforts should be made ceaselessly, to

organise part-time and evening courses on the widest possible scale. The entire matter, therefore, takes on a long-range aspect.

2.2. The other channel of recruitment of supervisory personnel for industry is the Polytechnics or Junior Technical Institutions which conduct full-time three-year Diploma courses in the different branches of Engineering/Technology with Matriculation or equivalent as the admission qualification. These courses are supposed to train the candidates for supervisory positions in industry, but in fact they do not do so completely and effectively. The Diploma-holders lack the required practical experience and the industry has to condition them in the works for periods varying from two to three years before entrusting them with supervisory work, even at the lowest level. This responsibility, the industry does not accept cheerfully. The absence of well organised systems of apprenticeship in industry which the Diploma-holders might undergo either during the course or immediately after has added to the difficulties. The Diploma-holders themselves do not generally accept pre-employment apprenticeship as a necessity ; most of them expect Supervisory positions as soon as they leave the institutions.

2.3. When the industrial development of the country is planned on a large scale, the supply of Technical manpower has to be ensured speedily as it will serve little purpose to rely on the necessarily slow process of training industrial workers from the bottom upwards by means of part-time day or evening courses or on the pre-employment apprenticeship training of Diploma-holders from the Polytechnics. Otherwise, the unhealthy conditions in which one industrial unit lures away the trained personnel from another, particularly the older ones will prevail as indeed is reportedly happening to some extent, at present.

3. *Sandwich Courses*

3.1. A solution to the above problem is the method of 'Sandwich Courses', also called 'Cooperative Courses' in the USA, in which layers of full-time institutional study and industrial experience alternate and the two are integrated within the overall period of the course. The 'Thickness of the Sandwich' varies according to the needs and circumstances of the industry and institution which cooperate in the programme. It may be six months in industry, succeeding six months in an institution and so on for three to five years ; or on a short period basis e.g. a weekly turn about which makes it possible to interchange students, Cox-and-Box fashion between industry and institution. Whatever may be the

turnabout, just as the clinical experience of the medical student in 'walking the wards', so the experience in industry fulfils an essential need for the Engineer or Technician within the overall period of training and not in some post-dated period. The Sandwich and Cooperative Courses afford many advantages of which the following are of particular importance :—

(a) An actual knowledge of, and experience with the execution in industry of Engineering designs, projects and developments.

(b) An understanding of, and familiarity with the problems and viewpoints of working men and women.

(c) Adjustment of Engineering students to Engineering employments by gradual and easy transition from academic pursuits and mode of life to the requirements of industry.

(d) Preparation of the students for the management and operating functions which, to a greater or lesser degree, enter into most Engineering careers.

(e) The plant, equipment and laboratory available in industry will be on a scale and standard utterly beyond the resources of any teaching institution, which is also spared of acute problems of obsolescence. These facilities will enable a student to learn under actual industrial conditions and to become acquainted with job practices, skills, labour and plant operations before rather than after graduation.

3.2. The above advantages obtain throughout the training programme and the courses can be so designed as to train the students for the different positions in industry—from the junior-most supervisor to executive. The only variables are, the academic standards of the course in the institutions and admission requirements, and to some extent, the relative emphasis on the acquisition of job practices, skills, labour and plant operations, and on the execution of designs, projects and developments.

3.3. Both industry and teaching institutions are partners in the sheme of Sandwich courses and bear equal responsibility for its success. Subject to this cooperation being ensured a variety of arrangements is possible for organising the courses at different centres. The various factors to be considered are, the nature and structure of the industry, its distribution and the consequent catchment area for the course in the institution. If the catchment area is local, say 5-10 miles radius, a short period basis, e.g. a weekly turnabout may be favoured ; a long-term basis, e.g. six-monthly periods, undoubtedly favours a much wider catchment area and may well require registered

lodgings. Better still, it may justify the setting up of hostels ; thus giving the students the benefit of residential education. There are benefits both in the principle of prolonged immersion and in a series of repeated dips. The former gives a total effect with the advantage of full-time education, while the latter is a constant challange to adaptability and provides a great likehood of integrating theory and practice. On the other hand, the prolonged period means a long gap in study which may have to be offset by part-time tutorial classes during the works period. There is nothing absolute or sacrosanct or even as yet traditional about the relative length of periods in institution and industry—all that matters is that it should be freely decided by discussion between the representatives of industry and the institution and the scheme undertaken as a fully cooperative enterprise.

3.4. The structure of the industry may have a critical effect on the administration of the course whether it shall be an 'institution-based' or a 'works-based' course. In the former, the students are enrolled by the institution and placed in industry for the works periods ; in the latter, the students first of all enter industry and are then seconded or released by their employers to attend the institution. Where industrial activity is not closely-knit and the system of part-time day education has not been well established, institution-based Sandwich courses are to be preferred. For other reasons also, it is easier to initiate and develop the courses. With an administration centralised in the institution, schemes can be worked with firms over long distances and, for the institution period, can more readily provide the necessary residential facilities. Institution-based courses on a Cox-and-Box arrangement for a 'student place' in the firm are more readily made from the institution. To these, American experience has added further arguments. The first is that the student remains primarily as a student in training and not a full-time operative or employee subject to the full force of industrial hazards and problems. While the whole purpose of a cooperative course is to give a real industrial experience, a student should not receive its full force and he should be 'eased into' the industrial situation. This is more readily secured in an institution-based course. The greater the established reputation of the institution the more it is able to insist on its students remaining in *statu pupillari* and having an integrated rather than an *ad hoc* works experience.

4. *A Sandwich Course in Mechanical Engineering*

4.1. The problem of training Foremen for the Engineering industry

being urgent, it is necessary to introduce and develop in certain selected centres a Sandwich course of the appropriate standard. In designing the course, the duration, the contents and the method of training will have to be related to the nature and structure of the industry.

4.2. It must be appreciated at the outset that no course, Sandwich or otherwise and however well-designed, can produce a ready-made Foreman for industry. A good Foreman represents the end point of a process through which a Supervisor passes over a period of years. The course will only help a person to enter industry at the lowest level of Supervisor and equip him with the knowledge and practice of his subject necessary to see him through the process successfully. At every stage of his journey to the Foreman's position, the person has to relate what he has learnt in the course with the practical experience which he acquires in industry and develop his ability in a step-wise manner.

4.3. The Engineering industry requires that a fresh recruit to a Supervisory position should possess at least three years of full-time apprenticeship training or equivalent industrial experience in a suitable capacity. Consequently, the Sandwich course designed for this level of employment should provide for the equivalent of three years works' training within its framework which will have to be integrated with the institutional study. Further, a Supervisor's duties and responsibilities are specific with reference to a particular section of the organisation which he supervises, viz., Machine Shop, Pattern Making and Foundry, Smithy Fitting, Tool Room etc. As such, his industrial apprenticeship should include not only broad-based general workshop training but a certain amount of specialised training in the particular shop of his choice in order to equip him with the latest practices and techniques in that field.

4.4. So far as the institutional study is concerned, the standard and content of the course will have to be based on the National Certificate Course in Mechanical Engineering of the All-India Council for Technical Education with such modifications of the latter as are necessary. The National Certificate Course is of three years' full-time study with Matriculation or equivalent as the admission qualification and is made up of 1152 hours of Workshop Training and 2304 hours of instruction in Mechanical Engineering subjects including Drawing and Laboratory work. In a Sandwich course, the required Workshop Training is provided in the industry and therefore has to be excluded from the institutional studies. Further, the National Certificate Course is very broad-based both in concept and in the

content of the subjects. The method of work also emphasises the academic aspects inasmuch as for 790 hours of lectures, 434 hours of tutorials have been provided. In a Sandwich course, however, which has to be designed primarily to train a person for Supervisory position in industry with well-defined duties and responsibilities, it is not really necessary to provide for the same degree of broad-basedness in the institutional study as in the National Certificate Course. Keeping the standard of attainment in the different Technical subjects of importance the same, it should be possible to raise the contents and method of work in such a manner that the National Certificate Course when taken on Sandwich basis could be completed in less time than in the normal way. Such a reduction in the period becomes necessary when the total duration of the Sandwich course has to be determined both from the point of view of the candidates and the objectives of training.

4.5. The duration of the Sandwich course should not be too short or too long. If too short, it will not be possible to provide in full measure the required apprenticeship and institutional studies ; if too long, candidates will not be attracted. A judicious balance will have to be struck between the different extreme factors. It is felt that if the duration is fixed as four years and the method of work suitably arranged as indicated in the following paras. it will be possible to provide a well-balanced course which would meet all points of view. The crux of the arrangement is that a student should work at least 45 weeks a year both in the factory and in the institution ; and the number of hours of work per week in the factory should be the same as for any industrial worker and in the institution 42 hours per week. The total work-load, component-wise, of the Sandwich course will be as follows :—

Training in Industry

4.6. The factory year varies from concern to concern within the narrow range of 46 to 48 weeks. If the lower limit is accepted, a three-year apprenticeship will involve 138 weeks of work for a candidate in industry. This will have to be distributed among the different shops as follows :—

Shop	*No. of Weeks*
1. Carpentry & Pattern Making ...	16

Shop		*No. of Works*
2. Machine Shop	...	40
Turning 20		
Machining 20		
3 Fitting	...	24
4. Smithy	...	16
5 Tool room	...	12
6. Welding	...	6
7. Planning Progress & Drawing Office	...	12
8. Advanced Training in any particular shop	...	12
9. Foremanship & Supervision:	Training in this subject will be given during the above course on part-time basis as explained below.	
Total:		138 Weeks

Institutional Studies

4.7. The normal work-load in a Polytechnic is 36 hours/week and 32 weeks per year. If this standard is accepted, it will be difficult to design a Sandwich course of four years duration which will provide three-year industrial apprenticeship and Technical education of the National Certificate standard. It will therefore be necessary to increase the work-load in the institution for the Sandwich course. Further, in a Sandwich course a student is expected to work more than his counterpart in the other systems of education and training in order to derive the full advantages of the course. If during the industrial apprenticeship he is required to work in the factory for 42 hours a week and 46 weeks a year, there is reason why he should not put in the same amount of work for his institutional studies. In fact, it will be to his benefit to get used to the actual conditions of industrial work right from the beginning and develop the right attitude of a Supervisor.

4.8. Having regard to the above, it is proposed that the Sandwich course should consist of 46 weeks of institutional studies, each week consisting of 36 hours of work in the institution. This will give 1656 hours which may be allotted to the different subjects as

below :—

Subject	Hours of Work			Total
	Lecturers	Tutorials	Laboratory/ Field/Drawing Halls	
Mathematics ...	60	30	—	90
General Science ...	60	30	60	150
Languages ...	24	24	—	48
Mechanics ...	48	—	24	72
Applied Mechanics ...	72	48	48	168
Drawing ...	72	—	576	648
Hydraulics ...	24	—	24	48
Civil Engineering ...	24	—	24	48
Surveying ...	12	—	24	36
Engineering Materials ...	36	—	—	36
Electrical Engineering ...	48	—	48	96
Mechanical Engineering ...	24	—	—	24
Heat Engines ...	48	24	72	144
Worshop Technology ...	48	—	—	48
Foremanship & Supervision ...	320	—	--	—
Total : 1970 hours				

(320 hours of work for Foremanship & Supervision will be covered on part-time basis during the apprenticeship.)

It will be observed from above that the proposed curriculum does not differ in any material way from the curriculum prescribed for the National Certificate Course and the standard of attainment is maintained at the same level. The only difference is that the time allotted for the tutorials in the National Certificate scheme is reduced to some extent and the content of certain subjects which are only associated disciplines for Mechanical Engineering are revised and the time required correspondingly adjusted. In view of the fact that in the Sandwich course the students are not required to do any institutional work during their industrial apprenticeship and as such, will have sufficient time to do home study, the reduction in the number of hours for tutorial should not affect the standard of the course in any way.

4.9 The National Certificate Course includes Career Lectures Labour Relations & Civics, Workshop Organisation and Supervision and Estimating, Costing and Accounts. The Board of Management Studies of the All-India Council for Technical Education has drawn up a comprehensive scheme of training in Foremanship and Supervision to be organised on part-time basis for persons who are holding or may hold Supervisory positions in industry. The scheme includes training in : Elements of Supervision, Industrial History and Industrial Relations, Communications in Industry, Elementary Principles of Management, Elements of Personnel Management, Principles of Foremanship, Principles of Production Planning, Principles of Remuneration, Estimating and Costing and Safety in Industry. The course envisages 320 hours of work on part-time basis spread over a period of two years at the rate of two hours a day, two days a week, and 40 weeks a year. It is proposed that the Sandwich course should adopt this scheme in toto and delete the concerned subjects as given in the National Certificate Course. Further, it is desirable that the Course in Foremanship and Supervision should be covered on part-time basis during the apprenticeship of the candidates in industry as that will enable them to relate instruction in the subjects with what they observe and learn in the shops. For this purpose, in the last two years of the course, the candidates should attend the institution for about two days a week for about two hours each day in the evenings throughout their apprenticeship in the factory.

5. *Construction of the Sandwich Course*

5.1 The duration of industrial apprenticeship is 138 weeks. The institutional studies involve 1656 hours spread over 46 weeks at the rate of 36 hours/week. The total work spread over a period of four years would require the candidates to spend approximately 46 weeks per year in the works and institution together. It is not desirable that they should be required to do any more than this as sufficient allowance has to be made in the Sandwich scheme for public holidays, a short vacation of 2-3 weeks and time for examinations. Otherwise, at the young age at which they join, the students will regard the course as a drudgery and not a pleasant process—which it is should be, of learning and working and preparation for gainful employment in life.

5.2 As regards the 'Thickness of the Sandwich'—the duration of the alternative layers of industrial training and institutional studies, a variety of arrangements are possible depending upon the

circumstances of the institutions and participating industry concerned. Longer periods will enable the institution to aim at a wider geographical coverage ; and shorter periods closer integration of theory and practice. It will, therefore, have to be left to the institution and industry in each area to work out the best arrangement suited to them. However, having regard to the general state of industry in the country and the small extent to which apprenticeship facilities have been organised, shorter turnabouts seem to be more advantageous. From the point of view of the students also, longer breaks in their institutional studies are not to be preferred. For the purpose of the present scheme, the following two alternative arrangements are suggested which may, however, be modified according to the conditions prevalent in each centre.

(A) *First Arrangement* : In each of the first two years, the candidates will work three weeks in the industry and one week in the institution alternatively for the first 44 weeks ; and the last two weeks they will spend in the industry. In each of the last two years they will work three weeks in the industry and one week in the institution alternatively for the first 44 weeks ; and in the last two weeks, they will spend one week in the industry and one week in the institution.

(B) *Second Arrangement* : Throughout the four years, the candidates will attend the institution two whole days every week and remain in the industry for the rest of the time.

5.3 In the first arrangement, the candidates will be required to attend the institution for two evenings a week during the last two years of their apprenticeship in industry for instruction in Foremanship and Supervision. This, however, will not be necessary in the second arrangement as sufficient time will be available for covering the subject when they attend the institution for two full days a week for the institutional studies.

5.4 The question as to which of the above two arrangements is administratively more feasible will have to be considered in respect of each centre where the Sandwich scheme is to be introduced and the conditions obtaining thereat. However, *prima facie*, where an industrial organisation does not agree to the apprentices laying off for a whole week in order to attend the institution, the second arrangement seems to best meet the situation. From the point of view of the administrative convenience of the institutions also, this arrangement seems to be easier to introduce.

6. *Organisational Aspects of the Sandwich Course*

6.1 The success of the Sandwich course depends upon the extent to which the two partners, industry and institutions, cooperate. There is no question whatsoever that one of them is more important than the other. Both are equal and the arrangements for conducting the course should be based on mutual understanding.

6.2 The industrial concerns should be carefully chosen. They should provide full facilities for training in all aspects of Workshop practice and participate in the scheme not out of compulsion but out of a firm belief in its usefulness to the industrial development of the country and out of a sense of social responsibility to the community.

6.3 One single concern, if it is large enough, may serve the needs of an institution. Otherwise, a group of concerns may be coopted, each agreeing to take a certain number of candidates from the institution. Also, in the latter case, depending upon the range of facilities available in the concerns, groups of candidates may switch their respective places from concern to concern during the course. This will facilitate the inclusion of smaller concerns in the scheme which, though not individually but collectively, can provide the full range of training facilities required for the course.

6.4 Some industrial concerns have suggested that it will be difficult for them to take boys without any kind of preliminary workshop training as apprentices and would prefer the boys to come to them after they have had some workshop training in the institutions. From all points of view, however, it would be desirable if the boys went to the industry as apprentices right from the day they joined the course and the entire shop training for them was organised in the industry itself. However, if the consensus of opinion of the industry is otherwise, then the boys would have to be given preliminary workshop practice—Carpentry, Smithy and Fitting in the institutions. This training may extend over a period of 4-6 months in the workshops of the institutions.

6.5 The choice of institutions is equally important. Here two alternative courses are open. The first is, if in an industrial centre there is a well-established Technical institution, it may be developed for the Sandwich Courses. The second is, to establish new institutions in each industrial centre, the number of such new institutions being determined on the basis of the size and nature of industrial activity in that place. In locating the institutions, however, proximity to the industrial concerns will have to be kept in view as it will

be advantageous to have the institutions as close to industry as possible. However, it is more convenient and economical to organise the Sandwich courses in the existing institutions as far as possible.

6.6 Whether existing institutions are selected and developed or new institutions are established, each institution and its co-operating industrial concerns should jointly set up a small committee or board on whose advice and general supervision the Sandwich course might be organised. Such committees or boards will be of great value in planning the course on satisfactory lines from the point of view of both industry and institution as well as in solving various practical problems that might arise from time to time. Of equal importance will be the feeling of partnership which the industry will have when it serves on the joint boards.

6.7 The student must remain primarily as a student in training and not a full-time operative or employee of industry. He must be selected by the institution in consultation with the representatives of industry, if necessary, and must remain under the administrative and academic control of the institution throughout the course. During his work in the industry, however, he shall be under the general diciplinary control of the factory concerned. It has, however been suggested by some experts that up to 50% of the candidates may be the nominee of the cooperating industry which sponsor them for the course with the object of employing them, later on in Supervisory positions. This suggestion should be acceptable provided that the candidates concerned are regarded as the students of the course and not as employees of the particular concerns sponsoring them.

6.8. The industrial training of the candidate must be properly supervised and a continuous record of his progress maintained. The training itself must be integrated with his institutional studies as closely as possible. For this purpose, each factory, which participates in the scheme, should appoint a Superintendent of Training who will be in overall charge of the trainees and the training programme. For administrative and academic convenience, he might be seconded to the staff of the institution. Where a group of small concerns co-operate with an institution, the Superintendent of Training may be appointed by the institution itself and seconded to the concerns. In that case, one Superintendent can be in charge of all the trainees but he should be assisted in his work by a member of the Supervisory staff of each individual concern.

6.9. At the end of the course, the State Board of Technical

Education or the institution itself should hold an examination of the standard envisaged in the scheme of the National Certificate Course. The performance of the candidate in industry should be taken into account in the final assessment. The Diploma awarded by the State Board or by the institution should be endorsed for the National Certificate and full three years industrial apprenticeship.

7. *Financial Estimates* :

7.1. The cost of organising the Sandwich course will depend upon whether an existing institution is developed or a new institution is established for the purpose as well as on the facilities by way of staff, materials, etc., which will be provided by industry for the training. The number of students admitted each year will also have to be taken into account. The exact cost of the project should, therefore, be determined for each centre in the light of the conditions prevailing in that area. However, the cost of a typical institution to be established for the Sandwich course has been worked out in Annexure which may be summarised as follows :—

(A) *Non-Recurring* :		
Buildings-		
(i) Institution	...	Rs. 4.275 lakhs
(ii) Hostels	...	,, 5.5 lakhs
Equipment	...	,, 5.201 lakhs
Total	...	Rs. 14.976 lakhs
(B) *Recurring* :		Rs. 1.83 lakhs

7.2. As explained elsewhere in this scheme, if the institutions are required to give the students preliminary workshop training for 4-6 months before they join industry as apprentices, appropriate facilities for the purpose would have to be created in the institutions. The additional financial estimates on this account will be :

Non-Recurring :	
Buildings (Workshops) 25000 sq. ft. @ Rs. 12/8/- per sq. ft.	Rs. 31,250
Equipment (Workshop)	,, 50,000
Total	Rs. 81,250
Recurring :	Rs. 15,000

ANNEXURE

Estimates of Cost for a Typical Project

It is assumed that for conducting the Sandwich course a separate institution will be established which will have a number of cooperating firms. The entire expenditure on training in the works will be borne by the industry concerned and the only responsibility of the institution in this respect will be the appointment of a Superintendent of Training on its staff who will be seconded to the firms.

The institution is planned for an annual intake of up to 50 students and the laboratories and drawing halls for units of 25 to 30.

A hostel for 200 students will be attached to the institution and rent will be charged from the students. The messing arrangements will be separate and will be managed by the students themselves.

50% of the students will receive from the institution stipend of Rs. 40 p.m. for 11 months in the first two years and Rs. 50 p.m. in the last two years depending, upon their means and merit. The scipendiaries will be exempt from tuition fees. Of the rest 50% of the students, industry should pay appropriate stipends for as many as if sponsors.

The estimates for buildings, equipment, staff and other instructional facilities are based on the model of the National Certificate Courses prepared by the All-India Council for Technical Education.

A. *Non-recurring* :
Buildings (Net carpet area)

(i)	*Institution* :		
	(1) Classrooms	4×450=	1800 sq. ft.
	(2) Drawing Halls	3×1000=	3000 sq. ft.
	(3) Laboratories		
	General Science	2000 sq. ft.	
	Mechanics & Structures	1000 sq. ft.	
	Materials Testing	1000 sq. ft.	
	Heat Engines including Boiler Room	3500 sq. ft.	
	Electrical Laboratory including electrical shop	3000 ,, ,,	

	Hydraulics	1000 sq. ft.
		11500 ,, ,, 11500 sq. ft.
(4)	Maintenance Workshop	1500 sq. ft.
(5)	Principal's office, staff room, College office, students common room, library, stores, canteen	5000 ,, ,,
		22,800 ,, ,,
	Add 1/2 for plinth	11,400 ,, ,,
	Total	34,200 ,, ,,
	Cost @ Rs. 12/8/- per sq. ft. on the basis of Delhi Index	Rs. 4.275 lakhs
(ii)	Hostel for 200 students @ Rs. 2750 per student on the basis of Delhi Index	Rs. 5.5 lakhs
	Total for buildings	Rs. 9.775 lakhs

Equipment (cost)

1.	Science Laboratory	...	Rs. 35,000
2.	Mechanics & Structures	...	,, 14,500
3.	Strength of Materials	...	Rs. 51,600
4.	Survey	...	,, 25,000
5.	Electrical Laboratory	...	,, 75,000
6.	Heat Engines Laboratory	...	,, 1,20,000
7.	Hydraulics Laboratory	...	,, 70,000
8.	Maintenance Workshops	...	,, 50,000
9.	Furniture	...	,, 20,000
10.	Library	...	,, 15,000
			,, 4,76,100
	Add 10% for installation for 1 to 8 items		,, 44,000
	Total		,, 5,20,100

B. *Recurring* :

Staff

	Posts		*Average Annual Costs*
(1)	Principal Rs. 600—1000×1	...	Rs. 11,700

(2) Superintendent of Training Rs. 500-800×1	...	Rs. 9,555
(3) Lecturers Rs. 250-500×4	...	,, 23,140
(4) Head Draughtsman Rs. 250-500×1	...	,, 5785
(5) Instructors/Demonstrators Rs. 200-400×6	...	,, 28470
(6) Draughtsman Rs. 150-300×1	...	,, 3770
(7) Workshop Supervisor Rs. 150-300×1	...	,, 3770
(8) Head Clerk Rs. 160-450×1	...	,, 4875
(9) Accountant Rs. 160-450×1	...	,, 4875
(10) Clerks-Upper Division Rs. 80-220×3	...	,, 7995
(11) Typists/Lower Division Clerks Rs. 55-130×3	...	,, 5577
(12) Peons Rs. 30-35×4	...	,, 3796
(13) Laboratory bearers, cleaners, etc. Rs. 30-35×8	...	,, 7592
(14) Workshop staff Rs. 55-130×4	...	,, 7436
		1,28,336
Maintenance & Stores	..	,, 25,000

Scholarships

The expenditure ranges from Rs. 11,000 in the first year to Rs. 49,500 in the fourth year. The average of the expenditure for the four years may be taken into consideration for the present purpose. ... ,, 29,563

Total ... ,, 1,83,000

approx.

APPENDIX E

Minutes of the First Meeting of the Joint Committee of the University Grants Commission and the All-India Council for Technical Education, on the Development of Geology and Applied Geology

A meeting of the Joint Committee for the development of Geology and Applied Geology was held in the office of the University Grants Commission on 16th April, 1956 at 11 A.M. The following were present :—

1. Dr. D.N. Wadia . . Chairman
2. Dr. M.S. Krishnan
3. Dr. W.D. West
4. Dr. N.N. Chatterjee
5. Dr. B.R. Khedkar
6. Dr. B.D. Laroia . Secretary

1 : 1 At the outset Mr. Samuel Mathai, Secretary, University Grants Commission extended a welcome to the members of the Committee and said that the Commission would anxiously wait for their recommendations and would try to implement them with the least possible delay to help the development of training facilities in Geology and Applied Geology.

1:2 The Chairman then explained the purpose of the meeting and the scope of its deliberations.

1:3 The Secretary of the Committee briefly explained the circumstances which led to the appointment of the Joint Committee. He brought to the notice of the Committee the statements which had been circulated showing that 17 Universities in India have already facility for training in Geology and that during the First Five-Year Plan, Rs. 14,75,250/- were distributed as grant-in-aid to these Universities. Under the Second Five-Year Plan 20 Universities have submitted development schemes, estimated to cost Rs. 1,17,72,000/- (Non-recurring) and Rs. 74,00,000/- (recurring). He reminded the Committee that several personnels of this very Committee have already made important contribution as members of the Conference of Professors of Geology held at the instance of the Ministry of Education in

September, 1953, when various aspects and the problem of Geological education and training and particularly field training, were fully discussed. He also invited the attention of the Committee to the relevant extracts from the report of the Committee of Expert Geologist appointed by the above conference of Professors.

1:4 The members present expressed their general agreement with the observations made in the report to the effect that there seems to be a marked tendency in many Universities to increase the number of admissions or courses in Geology without providing proper instructional facilities by way of equipment, staff and accommodation. This tendency is undesirable both from the point of view of standard of training and employment prospects of the Graduates. The Committee felt that every effort should be made towards consolidation of the Geology Departments in the Universities and improvement of the standard of instruction ; wherever necessary the number of students admitted should be reduced in relation to the available instructional facilities. Regarding the development of research work, the Committee expressed the desire that selected Universities should undertake work in certain specified fields, which may be considered important from the point of view of local Geological environment as well as from the point of view of fundamental work.

1:5 The Committee was in favour of the view that field training should be made an integral part of Geological education in Universities, both at the undergraduate and the post-graduate levels and the training should be organised and carried out under qualified supervisors. So far as possible the duration of field training should be the same in all the Universities.

2:1 The Committee then discussed whether it should make recommendations regarding training in Mineral Technology and ore dressing. It was resolved that the purview of this Committee should include both *Pure Geology and Applied Geology.* In pure Geology should be included a good course in general economic-Geology Survey, Geological Mapping and the Principles of Prospecting.

For a complete course of Applied Geological education, the following subjects should be included :—

(a) Mining Geology, including Mineral Prospecting and Sampling; Mineral Economics ; principles of Mineral Benefication ; elements of Mining, Metallurgy and Assaying ; and Mineral Legislation.

(b) Principles of Geophysical and Geochemical Prospecting ;

(c) Ground-water Geology ;

(d) Economic Palaeontology ;

(e) Engineering and Soil Geology ;

(f) Utilisation of minerals in Industry

2:2 The Committee therefore decided not to deal with subjects like Ore-dressing and Mineral Technology.

3:1 The Committee further resolved that the normal M.Sc. course in Geology should cover a training period of two years after the B.Sc. degree, but for those taking Applied Geology an additional one-year course should be prescribed after the M.Sc.

3:2 For the associateship in Applied Geology at the I.S.M. and A.G., the course should be of six years duration, to be considered equivalent to the M.Sc. in Applied Geology of the Universities.

3:3 Students admitted to the course in Applied Geology, in the Universities should have taken at least two of the subjects from Physics, Chemistry or Mathematics, in the B.Sc. course.

3:4 The Committee recommends that the following criteria be adopted by the University Grants Commission for assigning grants to the Universities for post-graduate teaching in Geology and Applied Geology :—

4:1 The Committee resolved that the award of M.Sc. degree by them only should be discontinued forthwith.

4:2 Number of admissions in post-graduate classes (M.Sc.) should ordinarily be 12, but should not exceed 15.

4:3 No University should start post-graduate teaching unless it possesses the following :—

(a) *Standard Equipment* : Standard as well as research type microscopes, refractive index liquids, goniometer ; equipment for mineral separation, e.g., electro-magnetic separator, standard sieves ; Ore microscopes, polishing apparatus, small chemical laboratory with adequate modern physics-chemical apparatus for routine and special analysis.

(b) *Equipment for Field Work* :

(i) *Tonographical Surveying* should include plans, table & general surveying, traingulation, Prismatic compass, level and theodolite & also the use of Bruton compass and Abney level.

(ii) For camping, tents and camping furniture (camp cots and camp chairs and some camp equipment) will be needed. For surveying the instruments required are, a plane table, prismatic compass, theodolites etc.

(iii) For a unit of 12 students under training in the field the

following field equipment would be required :-

3 tents—9x9, single fly
Camp tables—3,
Camp folding chairs—14
Surveying Instruments—
Plane tables—2
Prismatic compass—2
Theodolits—1
Tents—5
Levelling instrument—1
Abney's level—2
Telescopic Alidade—2

4:4 For a unit of 12 students under training in the field there must be *two teachers* to supervise and guide the work.

4:5. Minimum period of field training should be six weeks during the course ; this should be over and above the instructional tours to places of Geological interest.

4:6. Expenditure incurred on field training should be considered as approval expenditure. This will also include railway fare, transport charges of tents, camp furniture, rock specimens and the wages of staff engaged during the camp.

5. The Committee recommends that the Geological Survey of India should arrange for a special training camp for teachers from these Universities which have been approved to start the course in Applied Geology. The Geological Survey of India should be able to take 30 teachers in a training camp.

6. The Committee recommends that following the practice of the A.I.C.T.E. for the post-graduate courses in Engineering and Technology, 50% students going in for one-year course in Applied Geology should receive a stipend of Rs. 150/- each or better still an *ad hoc* grant be paid to the University on this basis and the amount so paid may be divided amongst the whole batch of students at the discretion of the University.

7. The Committee recommends the following order of priorities for giving financial assistance :—

1. Rehabilitation
2. Improvement and expansion of existing facilities ;
3. Fresh proposals ;
4. Building (the Committee recommends a floor area of 15,000 sq. ft. for the Post-graduate teaching including Applied Geology).

8. The Committee recommends that training in Applied

Geology may be encouraged at the following Universities only for the present :—

1. Andhra
2. Aligarh
3. Banaras
4. Calcutta
5. Jammu & Kashmir
6. Madras
7. Mysore
8. Nagpur
9. Osmania
10. Saugar.

9. The Committee feels that no useful purpose will be served at present by teaching Geology at post-graduate stage at the following centres :—

1. Annamalai University
2. Baroda University
3. Karnatak University
4. Gauhati University
5. Travancore University
6. Venkateswara University.

10. The Committee considered the scheme, submitted by the Nagpur University for developing the department of Geology and for starting new courses in Applied Geology and Geo-Physics. It was noted that the University intended to meet the expenditure on those schemes from the donation of Rs. 6,50,000/- given by the Central Provinces Mangenese Ore Co. Ltd., through the University Grants Commission.

The University has submitted two alternative schemes, these are :—

First Scheme : For Geology, Applied Geology and Geo-Physics

	Non-recurring expenditure
(1) Building	Rs. 1,92,116
(2) Equipment for Pure Geology	Rs. 34,000
(3) Equipment for Applied Geology	Rs. 1,00,000
(4) Equipment for Geo-Physics	Rs. 2,75,000
(5) Books and Journals	Rs. 9,000
Total	Rs. 5,60,116

	Recurring expenditure for 4 years
(For additional staff, scholarships, and contingencies etc.)	Rs. 89,884
Total (N.R. Plus R)	Rs. 6,50,000

2nd Scheme : (for Geology and Applied Geology)

	Non-recurring
(1) Building	Rs. 1,92,116

(2) Equipment for Pure Geology	Rs.	31,000
(3) Equipment for Applied Geology	Rs.	1,00,000
(4) Books and Journals	Rs.	9,000
Total	Rs.	3,35,116

Recurring expenditure for 4 years

(for additional staff, scholarships and contingencies etc.)	Rs.	58,839

N.B. of this amount, Rs. 55,000 will come from the interest on Rs. 3,11,045/- intended to be invested in Government securities.

The Committee was not in favour of the Nagpur University starting training in Geo-physics. It, therefore, approved the scheme No. 2 submitted by the University.

11. The Committee considered the scheme forwarded by the Saugar University and approved the same in principle. Before taking a final decision, the Committee desired to be assured by the University that the scheme would continue in operation after the expiry of five years period, during which the donation of Rs. 6,50,000 given by the C.P. Manganese Ore Co. Ltd., would be fully utilised. The Secretary was requested to secure an assurance from the University that the finances would be provided for the continuation of the Department of Geology even when the donation of Rs. 6.5 lakhs is exhausted.

12. The Committee recommended that the next meeting be held in Calcutta in the month of July, 1956.

13. A Sub-Committee consisting of Dr. D.N. Wadia, Dr. M.S. Krishnan and Dr. B.D. Laroia was authorised to deal with such urgent matters as might arise before the next meeting of the Committee.