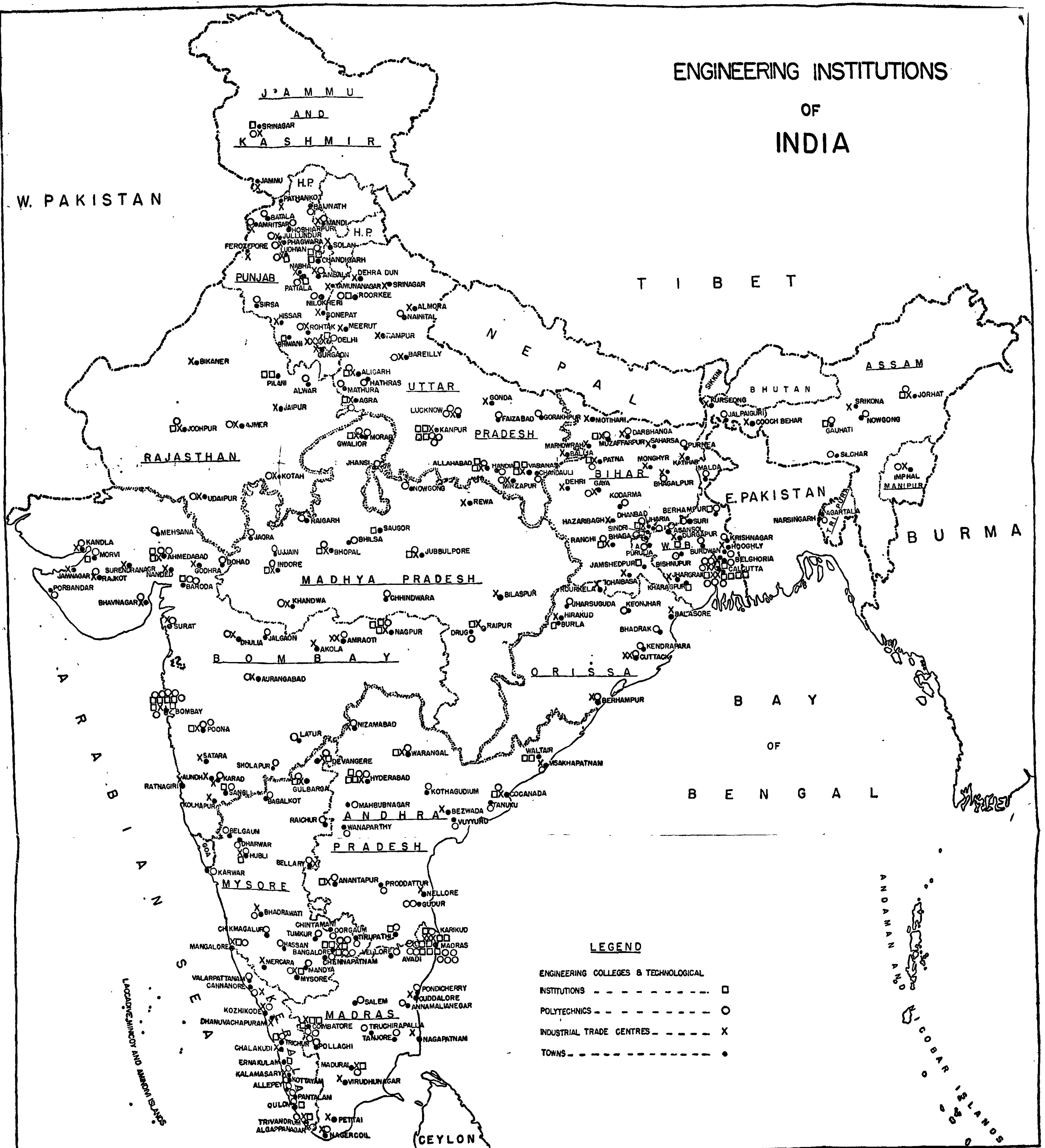




REPORT
OF THE
WORKING GROUP ON TECHNICAL
EDUCATION
AND
VOCATIONAL TRAINING

GOVERNMENT OF INDIA
PLANNING COMMISSION, APRIL, 1960

ENGINEERING INSTITUTIONS OF INDIA



FOREWORD

The primary aim of the Government in a welfare state like ours is raising the standard of living of the people. Large scale industrial development and production are the *sine qua non* of any nation building activity intended to achieve this goal. Scientists, engineers and technologists are essential for forging ahead towards this end. As our industries develop, and as our production is stepped up, the need for engineers and technologists will also increase steeply; and there should be a corresponding increase in the number of skilled technicians and craftsmen. For this purpose an accelerated programme of expansion of technical education was undertaken during the Second Plan period at a cost of nearly Rs. 60 crores as development expenditure for degree and diploma courses only, and the tempo has to be maintained through the Third and successive plans.

However, quantitative expansion is only half the effort. It is equally important to set new standards, to examine existing patterns and to suggest new ways of organisation from the point of view of economy and efficiency. The opportunities created call for new methods of training, teaching and organisation of the whole field of technical education. Our work in this all important field of national endeavour naturally leads us to a study of developments in U.S.A., U.K., U.S.S.R., and other advanced countries. While we have to learn many a lesson from them, we must bear in mind the fact that our attempt should not be just a copy of their ideas, ideals and methods, but to evolve a pattern of progress which is closely related to our national needs and aspirations, and is in tune with our historical development. The Working Group on Technical Education and Vocational Training and its sub-committees addressed themselves to this task. The Group met several times and discussed all aspects of the subject. Certain concepts and ideas of technical education and vocational training, on which the Group has expressed its views, have been embodied in Chapters II, III and IV which form an introduction to the subject. Chapter V gives an account of how educational facilities expanded during the Second Plan, and Chapter VI deals with the requirements in the Third and Fourth Plans and indicates the measures that should be taken for further expansion. Suggestions in regard to improvement and new ideas on patterns of technical education and vocational training have been stated in the form of recommendations in Chapter VII. Financial implications have been worked out in Chapter VIII and problems of qualitative improvement have been briefly touched upon in Chapter IX.

Since the Working Group last met on 26th December, 1959, one of its sub-committees, dealing with the assessment of personnel required in the Third and the Fourth Plans and facilities for training, has collected further information. And the financial implications of various recommendations along with the physical targets have been revised in the light of further data obtained; this has been explained in the report.

The optimum size of a College and Polytechnic and their changing patterns have been discussed, and due emphasis has been laid on part-time courses, short-term courses and correspondence courses. Experts in the field of technical education have examined very carefully the new concepts in the light of our requirements in the Third and successive plans and it is hoped that speedy and vigorous action will be taken on some of the important recommendations.

The considerable amount of information and statistical data which the Working Group received from different Ministries, State Governments, institutions, representatives of public and private sectors, and other organisations, have been summed up in the form of tables in the body of the report and more useful information has been presented in statements included as Appendices. A list of papers, notes and memoranda considered by the Working Group, and its committees, appears in Appendix III as well as in the select bibliography.

I would be remiss if I do not express here my sincere thanks to the different Ministries, State Governments, institutions, representatives of public and private sectors, and other organisations for their cooperation. They furnished us valuable material and statistical data which has proved of great help. The colleagues who served with me on the Working Group, and to whom I owe a debt of gratitude, have not only helped in supplying information from their side but also contributed in a large measure in attacking the problem from an angle in the light of scientific and technological developments we are witnessing today.

Finally, I would like to record my appreciation of the work done by the staff of the Education Division, Planning Commission and in particular Shri K. L. Joshi, Director, Education Division, who acted as our Member-Secretary.

New Delhi,
20-4-1960.

Sd./- M. S. Thacker,
Chairman,
*Working Group on Technical Education
and Vocational Training.*

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APPENDIX I

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26. Shri N. G. Dewan, Chief Engineer, Central Public Works Deptt. Ministry of Works, Housing & Supply, New Delhi.

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27. Dr. B. D. Laroia, Development Officer, University Grants Commission, Old Mill Road, New Delhi.

Experts.

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29. Shri G. L. Bansal, Secretary-General, Federation of Commerce & Industry, Barakhamba Road, New Delhi.
30. Professor D. L. Deshpande, Director, Bihar Institute of Technology, Sindhri Institute, P.O., Dhanbad (Bihar).
31. Dr. P. K. Kelkar, Director, Indian Institute of Technology, Kanpur.
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33. Principal V. Lakshminarayanan, Birla College of Engg., Pilani P.O. (Rajasthan).
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7. Shri P. N. Gupta, Asstt. Director, Small Scale Industries, New Delhi.
8. Shri S. E. Joseph, Asstt. Chief, Planning Commission, New Delhi.
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44. Shri B. N. Datar, (Chief L & E.) Planning Commission, New Delhi.
45. Dr. K. P. Basu, O.S.D. (SR Div.) Planning Commission, New Delhi.
46. Shri K. L. Joshi, Director (Education) Planning Commission, New Delhi.—Member Secretary.
- Shri D. P. Nayar, Director (Education) Planning Commission, New Delhi.
- Shri S. N. Saraf, Asstt. Chief, Planning Commission, New Delhi.
- Shri J. L. Azad, Senior Research Office Planning Commission, New Delh.
- Shri K. R. Sivaramakrishnan, Senior Research Officer, Planning Commission New Delhi.

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17. Shri A. Sarker, Ministry of Community Development & Cooperation, New Delhi.
18. Shri Sham Narain, Asstt. Educational Adviser, Ministry of Education, New Delhi.
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20. Mr. F. Wade—Cooper, Genl. Elec. Co. (India) Ltd., New Delhi.

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4. Shri B. N. Datar.
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10. Shri Tarlok Singh.
11. Shri K. L. Joshi—Member-Secretary.

II. Craftsmen Training and Technical Education at Secondary Education level (including apprenticeship, practical training & part-time courses).

Special invitees

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|---|--|
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Shri S. N. Saraf—Secretary
Asstt. Chief, Planning Commissions.

APPENDIX III

Papers, notes, memoranda, considered by the Working Group and its Committees.

Sl.	Author	Subject
1	Aiya, S. V. C.	Technical Education in the III Plan.
2	"	Engineering Education.
3	"	Teachers for Vocational Education
4	"	Comments on Prof. D. L. Deshpande's note regarding the optimum student population.
5	Chandiramani, G. K.	Steps taken for the Training of Teachers for Technical Institutions.
6	"	Part-time/short term courses.
7	Directorate General of Resettlement and Employment (Ministry of Labour & Employment)	Statements indicating sanctions issued upto 31-3-59 for Craftsmen Training Scheme (DGRE) during the Second Five Year Plan—List of Institutes and seating capacity, Trade-wise and State-wise.
8	"	Craftsmen Training Schemes—Programmes for the Third Five Year Plan.
9	"	Training of Overseers, Draughtsmen, etc. under D.G.R.E since discontinued.
10	Deshpande, D. L.	Optimum student population in a Technical Institution (two papers).
11	Guha, A. B.	Location of facilities for the training of craftsmen working in the mines near the industries.
12	"	Assessment of requirements of technical personnel made by Geological Survey of India.
13	"	Requirements of Technical personnel for production of coal during the 3rd Plan period.
14	Joshi, K. L.	Multi-purpose schools with Technical Stream and Jr. Tech. Schools—relationship with Vocational Education.
15	"	Requirements of craftsmen during the Third and Fourth Plans—A tentative exercise.
16	"	Institutional Training for Craftsmen Courses under the existing conditions.
17	"	Comparative study of organisation of Education through correspondence courses in the USSR and the USA.
18	Kapur, B. D.	Expansion of facilities for Technical Education & Training.
19	"	Utilisation of available Tech. Man-power.
20	"	Craftsmen Training in Defence.
21	Kapur, R. K.	Junior Technical Schools and the Technical elective in the Multipurpose Schools.
22	Laroia, B. D.	Need for Part-time Courses.
23	Ministry of SR & CA	Practical Training to Degree & Diploma Holders in Engineering & Technology.
24	Ministry of Labour & Employment	Note on Apprenticeship Training.
25	"	Report of the Advisory Committee on Technical Training 1944-45

Sl.	Author	Subject
26	Ministry of Community Development & Co-operation.	Training programmes for Rural Artisans in the C.D. Areas and requirements of teachers for the training centres for Rural Artisans.
27	Mathai, P. M.	Requirements of Rural Artisans' Training Centres and Instructors thereof in Community Development areas and the facilities required for the training of the Instructors.
28	Ministry of Commerce & Industry (Evaluation Unit)	Facilities provided by All-India Boards for the training of Village Artisans and Craftsmen.
29	Planning Commission (Education Division)	Consideration of development of facilities for Technical Education and Training.
30	" . . .	Assessment of the extent of Development of facilities for Technical Education by the end of the Second Plan.
31	" . . .	Practical Training of Engineering Graduates and Diploma Holders.
32	" . . .	Shortage of teachers for Technical Institutions.
33	" . . .	Problem of utilization of trained manpower.
34	" . . .	Technicums in the U.S.S.R.
35	" . . .	Estimated cost of introducing Merit/Loan Scholarships etc. for the students of Technical Institutions at the Diploma and Degree levels during the Third Five Year Plan.
36	" . . .	Financial outlay for the Development of Technical Education during the Third Five Year Plan—a preliminary exercise.
37	" . . .	Statements regarding enrolment of Physical facilities etc. in respect of some big Technological Institutions in the U.S.A.
38	" . . .	Note on the position of the targets etc. on Industry, Transport, Irrigation and Power Projects in the Third Plan.
39	" . . .	Intake and out-turn of Engineering Graduates and Diploma—holders during 1950-1970.
40	" . . .	Broad Estimates of the requirements of Engineering Personnel 1961-71.
41	" . . .	Augmenting the supply of Basic Science Graduates and improving their quality.
42	" . . .	Wastage in Technical Education (Note)
43	Pant, Pitamber . . .	Preliminary report on wastage in Technical Education.
44	Planning Commission (Village & Small Industries Division)	Present position in regard to the recommendations of the Technical Training Committee (Also known as the Advani Committee).
45	" . . .	Training facilities provided under the Commerce & Industry Ministry's Programme for Small Scale Industry.
46	Prakash, A. . .	Rural Artisans' Training Centres (Institutional and Peripatetic type) for C. D. Areas under the Third Five Year Plan.
47	Rajnath, P. . .	Requirements of Training Facilities provided for teachers of Craftsmen Training Institutes.
48	" . . .	Location of Training facilities in the vicinity of industries.
49	" . . .	Grant of Stipends to the trainees of Industrial Training Institutes/Centres.
50	" . . .	Accommodation for the Central Training Institutes for Instructors.

III

Sl.	Author	Subject
51	„1 . . .	Accommodation for Industrial Training Institutes centres.
52	„ . . .	Increasing the period of training in the Central Training Institutes for Instructors.
53	„ . . .	Revision of the Equipment List at present existing for the Industrial Training Institutes and Central Training Institutes for Instructors.
54	„1 . . .	Difficulties experienced in recruiting suitable craft instructors and steps taken to overcome these.
55	Rao, E. G. K. . .	Agricultural Engineering Course.
56	Small Scale Industries Board (Ministry of Commerce & Industry).	Minutes of the Twelfth Meeting of the Small Scale Industries Board held at Shillong on 3rd, 4th and 5th Nov. 1958.
57	Small Scale Industries (Ministry of Commerce and Industry).	Training facilities provided by the Small Scale Industries Organisation.
58	Sham Narain . . .	Technological Courses in the Rural Institutes.
59	Sarkar, A. . .	Vocational Training Facilities for the unemployed under the Unemployment Insurance Scheme in Japan.
60	Sen Gupta, B. 7 . .	Diploma Education.
61	Tolani, T. N. . .	Technical Teacher Training Programme, Requirements and shortages.
62	Taraporewala, J. A. .	A note on Part-time Training.
63	Wellsman, R. P. . .	Memorandum on correspondence courses in India.

APPENDIX IV

GOVERNMENT OF INDIA,

Scientific Policy Resolution No.131 CF 57.

New Delhi, the 4th March, 1958 13th Phalgun, 78.

The key to national prosperity, apart from the spirit of the people, lies, in the modern age, in the effective combination of three factors, technology, raw materials and capital, of which the first is perhaps the most important since the creation and adoption of new scientific techniques can, in fact, make up for a deficiency in national resources, and reduce the demands on capital. But technology can only grow out of the study of science and its applications.

2. The dominating feature of the contemporary world is the intense cultivation of science on a large scale, and its application to meet a country's requirements. It is this, which, for the first time in man's history, has given to the common man in countries advanced in science, a standard of living and social and cultural amenities, which were once confined to a very small privileged minority of the population. Science has led to the growth and diffusion of culture to an extent never possible before. It has not only radically altered man's material environment, but, what is of still deeper significance, it has provided new tools of thought and has extended man's mental horizon. It has thus influenced even the basic values of life, and given to civilization a new vitality and a new dynamism.

3. It is only through the scientific approach and method and the use of scientific knowledge that reasonable material and cultural amenities and services can be provided for every member of the community, and it is out of a recognition of this possibility that the idea of a welfare state has grown. It is characteristic of the present world that the progress towards the practical realisation of a welfare state differs widely from country in direct relation to the extent of industrialisation and resources applied in the pursuit of science.

4. The wealth and prosperity of a nation depend on the effective utilisation of its human and material resources through industrialisation. The use of human material for industrialisation demands its education in science and training in technical skills. Industry opens up possibilities of greater fulfilment for the individual India's enormous resources of man power can only become an asset, in the modern world when trained and educated.

5. Science and technology can make for deficiencies in raw materials by providing substitutes, or, indeed, by providing skills which can be exported in return for raw materials. In industrialising a country, a heavy price has to be paid in importing science and technology in the form of plant and machinery, highly paid personnel and technical consultants. An early and large development of science and technology in the country could therefore greatly reduce the drain on capital during the early and critical stages of industrialisation.

6. Science has developed at an ever-increasing pace since the beginning of the century so that the gap between the advanced and backward countries has widened more and more. It is only by adopting the most vigorous measures and by putting forward our utmost effort into the development of science that we can bridge the gap. "It is an inherent obligation of a great country like India, with its traditions of scholarship and original thinking and its great cultural heritage, to participate fully in the march of science which is probably mankind's greatest enterprise today."

7. The Government of India have accordingly decided that the aims of their scientific policy will be:—

- (i) to foster, promote, and sustain, by all appropriate means, the cultivation of science, and scientific research in all its aspects—pure, applied and educational;
- (ii) to ensure an adequate supply, within the country, of research scientists of the highest quality, and to recognize their work as an important component of the strength of the nation;
- (iii) to encourage, and initiate, with all possible speed, programme for the training of scientific and technical personnel, on a scale adequate to fulfil the country's needs in science and education, agriculture and industry, and defence;

- (iv) to ensure that the creative talent of men and women is encouraged and finds full scope in scientific activity;
- (v) to encourage individual initiative for the acquisition and dissemination of knowledge, and for the discovery of new knowledge, in an atmosphere of academic freedom;
- (vi) and, in general, to secure for the people of the country all the benefits that can accrue from the acquisition and application of scientific knowledge.

The Government of India have decided to pursue and accomplish these aims by offering good conditions of service to scientists and according them an honoured position, by associating scientists with the formulation of policies, and by taking such other measures as may be deemed necessary from time to time.

APPENDIX V
PLANNING COMMISSION
(Education Division)

*List of Industrial Training Institutes (D.G.R.E.'s centres for training of craftsmen)
and their likely seating capacity at the end of Second Five Year Plan*

States	Name of the Institutes	No. of seats
NORTHERN REGION		
1. Punjab	1. I.T.C. Dayanand Polytechnic Institute, Amritsar	384
	2. I. T. C. Mehrchand Technical Institute, Jullundur	288
	3. Industrial Training Institute, Ferozepore	232
	4. Industrial Training Institute, Rohtak	502
	5. Govt. Industrial Training Institute, Patiala	448
	6. Industrial Training Institute, Nabha	144
	7. I. T. C. Polytechnic Instt. Phagwara	128
	8. Industrial Training Instt. Yamunanagar	304
	9. Govt. Moolchand Industrial School, Ambala Cantt.	16
	10. Industrial Training Institute, Sonapat	96
	11. Industrial Training Institute, Gurgaon.	200
	12. Industrial Training Institute, Pathankot	200
	13. I. T. C., Ludhiana	404
	14. Industrial Training Institute, Hissar	200
	TOTAL	3546
(2) Uttar Pradesh	1. I. T. I. Lucknow	672
	2. I. T. I. Allahabad	344
	3. I. T. I. Aligarh	528
	4. I. T. I. Almora	544
	5. I. T. I. Rampur	432
	6. I. T. I. Meerut	312
	7. I. T. I. Dehradun	208
	8. I. T. C. Varanasi	352
	9. I. T. I. Kanpur	1000
	10. Agra	264
	11. Bareilly	264
	12. Gonda	264
	13. Mirzapur	192
	14. Ballia	264
	15. Srinagar	264
	TOTAL	5904
(3) Rajasthan	1. I. T. I. Ajmer	400
	2. I. T. I. Jaipur	224
	3. I. T. I. Kotah	160
	4. I. T. I. Udaipur	160
	5. I. T. I. Jodhpur	152
	6. I. T. I. Bikaner	168
	TOTAL	1264

I	2	3
IV. Jammu & Kashmir	1. I. T. I. Srinagar	164
	2. I. T. I. Jammu	164
	TOTAL	328
V. Delhi	1. I. T. C. Delhi Polytechnic, Delhi	472
	2. I.T.I. Pusa, New Delhi	780
	3. I.T.I. Women, New Delhi	176
	4. I.T.I. Subzimandi, Delhi	224
	TOTAL	1652
VI. Himachal Pradesh	1. I.T.I. Silver-Jubilee Tech. Institute, Mandi	112
	2. I.T.I. Solan	90
	TOTAL	202
EASTERN REGION		
I. Assam	1. I.T.I. Jorhat	416
	2. I.T.I. Srikona	158
	TOTAL	574
II. Bihar	1. Industrial Institute Dighaghat, Patna	736
	2. I.T.I. Ranchi	240
	3. I.T.I. Monghyr	224
	4. Leela Deep Industrial Trg. Institute, Bhagalpur	208
	5. I.T.I. Dehri	256
	6. I.T.I. Darbhanga	192
	7. I.T.I. Dhanbad	288
	8. I.T.I. Katihar	144
	9. I.T.I. Chaibasa	256
	10. I.T.I. Muzaffarpur	288
	11. I.T.I. Gaya	288
	12. I.T.I. Saharsa	192
	13. I.T.I. Hazaribagh	144
	14. I.T.I. Motihari	144
	15. I.T.I. Marhowrah	32
	TOTAL	3632
III. Orissa	1. I.T.C. Cuttack	380
	2. I.T.C. Poor Cottage Industries, Cuttack	48
	3. I.T.I. Hirakud	192
	4. I.T.I. Behampur	200
	5. I.T.I. Rourkela	200
	6. I.T.I. Balasore	66
	TOTAL	1116

1	2	3
IV. <i>West Bengal</i> . . .	1. I. T. C. Tech. School, Calcutta : . 2. I.T.I. Gariahata . . . 3. I.T.I. Tollygunge . . . 4. I.T.I. How. Home Calcutta . . . 5. I.T.C. Krishnagar . . . 6. I.T.C. Kurseong . . . 7. I.T.I. Kalyani . . . 8. I.T.I. Jhargram . . . 9. I.T.I. Durgapur . . . 10. I.T.I. Chinsurah . . . 11. I.T.I. Cooch-Behar . . .	336 324 416 512 96 112 464 232 616 208 280
	TOTAL .	3596
V. <i>Manipur</i> . . .	1. I.T.I. Imphal . . .	96
VI. <i>Tripura</i> . . .	1. I.T.I. Agartala . . .	248
WESTERN REGION		
I. <i>Bombay</i> . . .	1. I.T.I. Bombay . . . 2. I.T.I. Aundh . . . 3. I.T.C. Poona . . . 4. I.T.C. Kolhapur . . . 5. I.T.I. Satara . . . 6. I.T.I. Ratnagiri . . . 7. I.T.I. Dhulia . . . 8. I.T.I. Godhra . . . 9. I.T.I. Jamnagar . . . 10. I.T.I. Kandla . . . 11. I.T.I. Surendranagar . . . 12. I.T.I. Bhavnagar . . . 13. I.T.I. Rajkot . . . 14. I.T.I. Nagpur . . . 15. I.T.I. Akola . . . 16. I.T.I. Amravati (I)* (Kala Niketan) . . . 17. I.T.I. Amravati (II) . . . 18. I.T.I. Ahmedabad . . . 19. I.T.I. Aurangabad . . . 20. I.T.I. Nanded . . . 21. I.T.I. Surat . . . 22. I.T.I. Karad . . .	764 448 308 144 128 128 88 92 368 168 140 80 64 448 160 104 184 256 250 244 176 240
	TOTAL	4982
II. <i>Madhya Pradesh</i> . . .	1. I.T.I. Indore . . . 2. I.T.I. Rewa . . . 3. I.T.I. Raipur . . . 4. I.T.I. Khandwa . . . 5. I.T.I. Bhopal . . . 6. I.T.I. Jabalpur . . . 7. I.T.I. Gwalior . . . 8. I.T.C. Koni, Bilaspur . . .	396 352 320 320 320 320 264 480
	TOTAL . . .	2772

*To be merged with I.T.I. Amravati after the combined Bldg. is ready.

1	2	3
SOUTHERN REGION		
I. Andhra Pradesh	1. I.T.I. Kakinada	392
	2. I.T.I. Anantapur	384
	3. I.T.I. Vijayawada	312
	4. I.T.I. Nellore	192
	5. I.T.I. Visakhapatnam	288
	6. I.T.I. Hyderabad	324
	7. I.T.I. Warangal	250
	8. I.T.I. Nizamabad	208
	9. Training Centres attached to Govt. Polytechnic, Hyderabad.	184
	TOTAL	2534
II. Kerala	1. I.T.I. Trivandrum	512
	2. I.T.I. Chalakudi	400
	3. I.T.I. Cannanore	400
	4. I.T.I. Dhanuvachapuram	216
	5. Industrial Training Centres, St Vincent Industrials, Kozhikode	224
	6. I.T.I. Kalamasary	96
	TOTAL	1848
III. Madras	1. I.T.I. Cuddalore	252
	2. I.T.I./Nagapatnam	252
	3. I.T.I./Virudhunagar	248
	4. I.T.I./Pettai (Tirunelveli)	252
	5. I.T.I./Guindy Madras-16	400
	6. I.T.C./Street Seva Mandir, Madras	112
	7. I.T.I./North Madras-1	128
	8. I.T.C./Govt. Polytechnic Coimbatore	96
	9. I.T.I. Madurai	128
	10. I.T.C./Pioneer Motor Service, Nagercoil	112
	TOTAL	1980
IV. Mysore.	1. I.T.I. Bangalore	480
	2. I.T.I. Gulbarga	258
	3. I.T.I. Mercara	96
	4. I.T.I., Hubli	348
	5. I.T.I. Mangalore	260
	6. I.T.I. Bhadravati	232
	7. I.T.I. Bellary	116
	8. I.T.I. Devangere	120
	9. I.T.I. Mysore	260
	TOTAL	2,170
GRAND TOTAL		38,444

PLANNING COMMISSION

(Education Division)

Appendix VI-A

List of Engineering/Technological Institutions (Degree Courses) and their likely seating capacity at the end of the Second Five Year Plan.

S.No.	Name of the Institutions	No. of Seats.					Total
		Civil Engg.	Mech. Engg.	Elect Engg.	Tech-nologies*	Others @	
1	2	3	4	5	6	7	8
<i>Northern Region:</i>							
<i>Delhi</i>							
1	Delhi College of Engg. & Tech., Delhi.	N.A.	N.A.	N.A.	N.A.	N.A.	250
							250
<i>Punjab.</i>							
2	Gurumanak Engg. College, Ludhiana	60	30	30	..	..	120
3	Punjab Engg. College, Chandigarh	120	60	60	..	..	240
4	Thapar Instt. of Engg. & Tech. Patiala	60	30	30	..	..	120
5	Technological Instt. of Textile, Bhiwani	..	..	..	60	..	60
6	Deptt. of Pharmacy, Punjab University, Chandigarh	..	..	..	..	15	15
7	Deptt. of Chemical Engg. & Tech., Punjab University, Chandigarh	..	..	..	30	..	30
							585
<i>Rajasthan.</i>							
8	Birla Engg. College, Pilani	60	60	60	..	30	210
9	M.B.M. Engg. College, Jodhpur	90	30	30	..	25	175
10	Birla College, Pilani	..	..	..	..	20	20
							405
<i>Uttar Pradesh.</i>							
11	College, of Engg. & Tech., Muslim University, Aligarh	60	30	30	..	..	120

*Includes courses in Textile Technology, Chemical Engg., Sugar Technology, Petroleum Engg., Fuel Technology etc., @Includes courses in Tele-Communication Mining, Metallurgy, Architecture, Aeronautical Engg., Pharmacy etc.

1	2	3	4	5	6	7	8
12	Engg. College, Banaras Hindu University, Varanasi .	120	75	75	..	..	270
13	Engg. College, Dayalbagh, Agra .	..	30	30	..	..	60
14	University of Roorkee, Roorkee .	120	60	60	..	50	290
15	College of Mining & Metallurgy Banaras Hindu University, Varanasi .	..	..	..	..	110	110
16	College of Tech., Banaras Hindu University, Varanasi .	..	..	..	30	52	82
17	H. B. Technological Ins- titute, Kanpur .	..	..	..	30	..	30
18	Govt. Central Textile Instt., Kanpur .	..	..	..	20	10	30
19	Indian Institute of Tech- nology, Kanpur .	N.A.	N.A.	N.A.	N.A.	N.A.	100
20	Regional Engg. College, Allahabad .	N.A.	N.A.	N.A.	N.A.	N.A.	250
21	National Institute of Sugar Tech., Kanpur .	..	..	..	..	15	15
22	Allahabad Agricultural Institute, Allahabad .	..	..	..	..	25	25
							1382

Jammu & Kashmir.

23	Regional Engg. College, Srinagar	N.A.	N.A.	N.A.	N.A.	N.A.	120
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Eastern Region.

Assam.

24	Assam, Engg. College, Gauhati	60	30	30			120
25	Engg. College, Jorhat	N.A.	N.A.	N.A.	N.A.	N.A.	120
							240

Bihar

26	Bihar College of Engg., Patna University, Patna.	60	30	30	..	..	120
27	Bihar Instt. of Tech., Sindri.	90	60	60	30	60	300
28	Birla Institute of Tech., Ranchi.	90	90	90	..	..	270
29	Muzaffarpur Instt. of Tech., Muzaffarpur	60	..	..	..	..	60
30	India School of Mines and Applied Geology, Dhan- bad.	..	..	..	..	150	150
31	Regional Engg. College, Jamshedpur	N.A.	N.A.	N.A.	N.A.	N.A.	280
							118

	2	3	4	5	6	7	8
<i>Orissa</i>							
32 College of Engg., Burla . .	60	30	30	..	..	..	120
<i>West Bengal.</i>							
33 Bengal Engg. College, Sibpore, Howrah.	160	60	60	..	120	..	400
34 College of Engg. & Tech., Jadavpur	90 20	90 20	90 (20	60 ..	40 ..	..	370 (60
			Part time courses)		part time courses).		
35 Deptt. of Applied Physics, Calcutta University, Calcutta	..	..	..	..	25	..	25
36 Institute of Radio Physics and Electronics, Cal- cutta University, Cal- cutta.	..	..	..	..	20	..	20
37 Indian Institute of Tech- nology, Kharagpur	100	75	75	15	142	..	407
38 College of Textile Tech., Serampur	..	..	..	30	..	..	30
39 Deptt. of Applied Chemistry, Calcutta University, Calcutta	..	..	..	..	36	..	36
40 College of Textile Tech., Brahampur	..	..	..	30	..	..	30
41 College of Leather Tech., Calcutta	..	..	..	..	10	..	10
42 Regional Engg. College, Durgapur	N.A.	N.A.	N.A.	N.A.	N.A.	..	280
							1608
<i>Western Region.</i>							
<i>Bombay.</i>							
43 Birla Vishwakarma Maha- vidyala, Anand	180	30	30	..	..	..	240
44 Engg. College, Poona	120	60	60	..	54	..	294
45 Faculty of Technology, Baroda University, Ba- roda	120	60	60	50	50	..	340
46 Govt. Engg. College, Nag- pur (to be shifted to Aurangabad).	60	30	30	..	..	..	120
47 L.D. College of Engg. Ahmedabad	150	90	60	..	..	..	300
48 Lukhdirji College of Engg Morvi	60	20	20	..	..	..	100
49 Victoria Jubilee Technical Institute, Bombay	70	35	35	25	..	..	165
50 Walchand College of Engg. Sangli	80	20	20	..	..	..	120
51 Department of Chemical Engg., Bombay Universi- ty, Bombay	..	..	..	60	115	..	175
52 Indian Institute of Tech- nology, Bombay	22	20	24	14	20	..	100
53 Laxminarayan Instt. of Tech., Nagpur	..	..	..	36	..	..	36

1215
13497

PLANNING COMMISSION

(Education Division)

APPENDIX VI--B

List of Engineering/Technological Institutions (Diploma Courses) and their likely seating Capacity at the end of Second Five Year Plan.

S.No.	Name of the Institution	Number of Seats					Total
		Civil Engg.	Mech. Engg.	Elect. Engg.	Tech-nologi-es.	Others@	
1	2	3	4	5	6	7	8
<i>Northern Region .</i>							
<i>Delhi.</i>							
1	Delhi Polytechnic, Delhi .	20	20	20	..	..	60
<i>Punjab.</i>							
2	Government Polytechnic, Ambala	120	60	60	..	..	240
3	Guru Nanak Engg. College Ludhiana	60	30	30	..	..	120
4	Mehr Chand Polytechnic, Jullundur	60	30	30	..	..	120
5	National Instt. of Engg., Hoshiarpur	60	30	30	..	..	120
6	Punjab Polytechnic, Nilotkheri	120	60	60	..	..	240
7	Ramgarhia Polytechnic, Phagwara	120	30	30	..	..	180
8	Tarakaran S.D. Tech. Instt. Baijnath	60	..	..	..	..	60
9	Thappar Polytechnic, Patiala	60	30	30	..	..	120
10	Punjab Instt. of Textile Tech., Amritsar	..	..	..	15	..	15
11	Govt. Training Institute, Jullundur	..	..	..	10	..	10
12	Central Polytechnic, Chandigarh	120	60	60	..	..	240
13	Polytechnic, Sirsa	N.A.	N.A.	N.A.	N.A.	N.A.	120
14	Polytechnic, Batala	N.A.	N.A.	N.A.	N.A.	N.A.	120
15	Polytechnic, Rohtak	N.A.	N.A.	N.A.	N.A.	N.A.	120
16	Polytechnic (Location not finalised)	N.A.	N.A.	N.A.	N.A.	N.A.	120
							2,005
<i>Rajasthan.</i>							
17	Jodhpur Polytechnic, Jodhpur	120	60	60	..	..	240
18	Ajmer Polytechnic, Ajmer	60	..	..	..	..	60
19	Udaipur Polytechnic, Udaipur	60	30	30	..	..	160
20	Polytechnic, Kotah	N.A.	N.A.	N.A.	N.A.	N.A.	120
21	Polytechnic, Alwar	N.A.	N.A.	N.A.	N.A.	N.A.	120
							700

§Includes courses in Textile Technology, Leather Technology, Printing Technology, etc.

@Includes courses in Tele-communication, Mining, Metallurgy, etc.

1	2	3	4	5	6	7	8
<i>Bihar.</i>							
48	Bhagalpur School of Engg. & Tech., Bhagalpur	60	..	..	..	..	60
49	Ranchi School of Engg., Ranchi	120	30	30	..	..	180
50	Dhanbad Polytechnic, Dhanbad	120	60	60	..	..	240
51	Tirhat School of Engg., Muzaffarpur	20	20	20	..	..	60
52	Evening Mining Classes, Bhaga	..	..	..	..	40	40
53	Mining Institute, Jharia	..	..	..	..	40	40
54	Mining Institute, Kodarma	..	..	..	..	40	40
55	Patna School of Engg., Patna	120	30	30	..	..	180
56	Polytechnic, Purnea	N.A.	N.A.	N.A.	N.A.	N.A.	180
57	Polytechnic, Darbhanga	N.A.	N.A.	N.A.	N.A.	N.A.	180
58	Polytechnic, Gaya	N.A.	N.A.	N.A.	N.A.	N.A.	180
							1,380
<i>Orissa</i>							
59	Jharsaguda School of Engg., Jharsaguda	120	30	30	..	..	180
60	School of Engg., Cuttak	120	30	30	—	—	180
61	Berhampur School of Engg.	120	30	30	—	—	180
62	Orrisa School of Engg., Keonjhar	—	—	—	—	40	40
63	School of Engg., Bhadrak	120	30	30	..	..	180
64	Polytechnic, Kendrapara	N.A.	N.A.	N.A.	N.A.	N.A.	180
							940
<i>Manipur</i>							
65	Polytechnic, Imphal, Manipur	30	15	15	..	..	60
							60
<i>Tripura</i>							
66	Polytechnic Instt., Narsingarh, Tripura	60	30	30	..	..	120
							120
<i>West Bengal</i>							
67	Asansol Polytechnic, Asansol	..	20	20	..	4	80
68	Calcutta Technical School, Calcutta	..	45	45	..	..	90
69	B.P.C. Tech. Instt., Krishnagar	60	30	30	..	..	120
70	Hooghly Instt. of Tech., Hooghly	120	30	30	..	..	180
71	Jadavpur Polytechnic, Jadavpur	120	30	30	..	..	180
72	Jalpaiguri Polytechnic, Jalpaiguri	120	30	30	..	..	180
73	Thargram Polytechnic, Thargram	120	30	30	..	..	180
74	K.G. Engineering Institute, Bishnupur	120	30	30	..	.	180
75	M.B.C. Instt. of Engg. and Tech., Burdwan	120	30	30	..		180

1	2	3	4	5	6	7	8
76	Murshidabad Instt. of Tech. Berhampur	120	30	30	..	..	180
77	Purulia Polytechnic, Purulia	120	30	30	..	..	180
78	R.K. Mission Shilpmandir, Belurmath	120	30	30	..	..	180
79	Shri Ramakrishna Vidya- peeth, Suri	60	..	..	..	..	60
80	School of Printing Techno- logy, Calcutta	..	..	..	80	..	80
81	R.K. Mission Shilpa Vidya- peeth, Belgoria	120	30	30	..	..	180
82	Polytechnic, (Ultadanga) Calcutta City	N.A.	N.A.	N.A.	N.A.	N.A.	240
83	Polytechnic, (Barasat) 24 Parganas	N.A.	N.A.	N.A.	N.A.	N.A.	120
84	Polytechnic, Malda	N.A.	N.A.	N.A.	N.A.	N.A.	120
							2,710

*Western Region**Bombay*

85	Bhailalbhai Bhikabhai Polytechnic, Anand	90	30	30	..	..	150
86	Government Polytechnic, Poona	180	60	60	..	20	320
87	Dr. S. & S.S. Gandhi Col- lege of Engg. & Tech., Surat	60	30	30	..	20	140
88	Polytechnic, M.S. Univer- sity, Baroda	180	60	60	..	..	300
89	Faculty of Engg. & Tech., M.S. University, Baroda	..	..	..	30	30	60
90	Government Polytechnic, Aurangabad	60	30	30	..	..	120
91	Government Polytechnic, Karud	60	30	30	..	..	120
92	Government Polytechnic, Aravati	60	30	30	..	..	120
93	Government Polytechnic, Nagpur	90	30	30	..	60	210
94	Government Polytechnic, Sholapur	60	30	30	..	..	120
95	Instt. of Engg. & Tech., Dhulia	60	..	..	..	..	60
96	Government Polytechnic, Ahmedabad	180	60	60	..	..	300
97	Lukhdhirji College of En- gineering, Morvi	60	20	20	..	..	100
98	Sir A. V. Parekh Tech. Instt., Rajkot	..	..	..	..	10	10
99	Shri Bhavsinghji Poly- technic, Bhavnagar	60	30	30	..	30	150
100	Sir Cusrow Wadia Instt. of Electrical Technology, Poona	60	30	30	..	20	140
101	Government Tanning Insti- tute, Khar, Bombay	..	..	..	15	..	15
102	Puranmal Lahoti Sararak Technical Instt., Latur	60	..	..	..	..	60
103	St. Xavier's Tech. Instt., Bombay	..	..	..	..	81	81

1	2	3	3	4	5	6	7
104	Victoria Jubilee Tech. Instt., Bombay	60	40	40	40	40	220
105	Walchand College of Engg., Sangli	60	30	30	..	..	120
106	R.C. Technical Instt., Ahmedabad	..	..	..	45	..	45
107	Regional School of Printing Tech., Bombay	..	..	..	25	..	25
108	Government Polytechnic, Dohad	60	30	30	..	..	120
109	Polytechnic, Bombay	N.A.	N.A.	N.A.	N.A.	N.A.	300
110	Polytechnic, Jalgaon	N.A.	N.A.	N.A.	N.A.	N.A.	120
111	Polytechnic, Porbandar	N.A.	N.A.	N.A.	N.A.	N.A.	120
112	Polytechnic, Mehsana	N.A.	N.A.	N.A.	N.A.	N.A.	120
							3,766

Madhya Pradesh

113	Central Technical Instt., Gwalior	60	30	30	..	..	120
114	Government Polytechnic, Ujjain	60	30	30	..	12	132
115	Government Polytechnic, Jabalpur	60	30	30	..	..	120
116	Government Polytechnic, Nowgong	60	30	30	..	..	120
117	Govindram Todi Govt. Polytechnic, Jaora	60	15	15	..	..	90
118	Samrat Ashok Poly., Bhilsa	60	..	..	..	..	60
119	Kirodimal Govt. Polytechnic, Raigarh	60	30	30	..	..	120
120	S.V. Patel Polytechnic, Bhopal	90	60	60	..	..	210
121	Sri Govindram Seksaria Technological Instt., Indore	90	30	30	..	..	150
122	Leather Technical Institute, Morar	..	..	..	30	..	30
123	Mining Institute, Chhindwara	N.A.	N.A.	N.A.	N.A.	40	40
124	Polytechnic, Khundwa	N.A.	N.A.	N.A.	N.A.	N.A.	120
125	Polytechnic, Drug	N.A.	N.A.	N.A.	N.A.	N.A.	120
							1,432

*Southern Region**Andhra Pradesh*

126	Andhra Polytechnic, Kakinada	60	60	60	..	60	240
127	Attached Polytechnic to the College of Engg. Anantapur	60	30	30	..	..	120
128	Government Polytechnic, Vizagapatnam	60	60	60	..	..	180
129	Government Technical College, Hyderabad	90	60	60	..	60	270
130	Government Polytechnic, Warangal	60	30	30	..	..	120
131	Government Polytechnic, Tirupathi	90	45	45	..	..	180

1	2	3	4	5	6	7	8
132	Hyderabad Polytechnic, Hyderabad	60	30	30	..	..	120
133	Vuyyuru Polytechnic, Vuyyuru	90	45	45	..	..	180
134	Mining Institute, Kotha- gudium	..	..	..	..	40	40
135	Mining Institute, Gudur	..	..	..	..	40	40
136	Ceramic Institute, Gudur	..	..	..	..	23	23
137	Government Polytechnic, Proddattur	60	30	30	..	..	120
138	Government Polytechnic, Nizamabad	60	30	30	..	..	120
139	Krishna Devarya Poly- technic, Wanaparthi	60	30	30	..	..	120
140	M. V. M. Polytechnic, Tenuku	60	30	30	..	..	120
141	Mahboobnagar Polytechnic, Mahboobnagar	60	30	30	..	..	120
							2,113

Kerala

142	Algappanagar Polytechnic, Algappanagar	60	30	30	..	..	120
143	Government Polytechnic, Kalmassary	60	60	30	..	20	170
144	Kerala Polytechnic, Kozhi- koda	100	50	50	..	20	220
145	Maharajas' Tech. Institute, Trichur	60	30	30	..	..	120
146	Shri Narayana Polytechnic, Quilon	60	30	30	..	..	120
147	Government Polytechnic Cannanore	60	30	30	24	..	144
148	Central Polytechnic, Tri- vandrum	60	30	30	..	..	120
149	Carmel Polytechnic, Alle- pey	60	30	30	..	..	120
150	N.S.S. Polytechnic, Pand- lam	60	30	30	..	..	120
151	Shri Rama Polytechnic, Valappad	60	30	30	..	..	120
152	Polytechnic, Kottayam	NA	N.A.	NA	NA	NA	120

1,494

Madras

153	Alagappa Polytechnic, Karikudi	60	30	30	..	..	120
154	A.M.M. Charities Trust Poly., Avadi	60	30	30	..	..	120
155	Annamalai Polytechnic, Chettinad	60	30	30	..	..	120
156	Central Polytechnic, Madras	90	60	60	..	..	210
157	C.N.T. Institute, Veppery, Madras	60	30	30	..	..	120
158	Government Polytechnic, Coimbatore	60	60	30	..	80	230

	1	2	3	4	5	6	7	8
159	Institute of Leather Tech., Madras	..	..	..	..	30	30	
160	Ramakrishna Mission Tech. Instt., Madras	..	..	..	..	30	30	
161	Nachhimathu Polytechnic, Pollachi	60	30	30	..	..	120	
162	P.S.G. & Attached Poly- technic, Coimbatore	60	30	30	..	..	120	
163	P.S.G. Industrial Institute, Coimbatore	..	..	..	60	..	60	
164	Shesashayee Institute of Technology, Ciruchira- palla	60	30	30	..	..	120	
165	Tamilnad Polytechnic, Madurai	60	80	40	..	20	200	
166	Government Polytechnic, Nagercoil	60	..	60	..	..	120	
167	Government Polytechnic, Vellore	60	..	60	..	..	120	
168	Regional School of Printing Tech., Madras	..	..	..	180	..	180	
169	Desigar Polytechnic, Tan- jore	60	30	30	..	..	120	
170	Sankar Polytechnic, Sankarnagar	60	30	30	..	..	120	
171	Thiagaraja Polytechnic, Salem	60	30	30	30	..	150	
172	Muthiah Polytechnic, Annamalainagar	60	30	30	..	..	120	
173	S.V. Nodar Polytechnic, Vurdunagar	60	30	30	..	..	120	
								2,650

Mysore

174	S.K.S.J. Tech. Instt. Bangalore	..	..	..	40	..	40	
175	Silver Jubilee Occupational Instt., Bangalore	60	60	60	..	105	285	
176	School of Mines, Oorgaum	..	..	..	..	40	40	
177	B.V.B. College of Engg., & Tech., Hubli	60	30	30	..	..	120	
178	D.R.R. Occupational Instt., Davangere	50	30	50	..	..	130	
179	Govt. Polytechnic, Gul- barga	60	30	30	..	..	120	
180	Karnataka Polytechnic, Mangalore	60	30	30	..	..	120	
181	K.H. Kabbar Instt. of Engg., Bharwar	60	30	30	..	..	120	
182	National Institute of Engineering, Mysore	60	..	30	..	..	90	
183	Occupational Instt., Chin- tamani	60	30	30	..	..	120	
184	Govt. Polytechnic, Bellary	60	30	30	..	..	120	
185	Polytechnic, Tunkur	60	30	30	..	..	120	
186	Polytechnic, Chennapat- nam	60	30	30	..	..	120	
187	Silver Jubilee Tech. Instt., Bhadravati	..	30	..	..	..	30	
188	S.L.V. Occupational Instt., Hasan	60	30	30	..	..	120	

1	2	3	4	5	6	7	8
189	M.E. Society's Polytechnic, Bangalore	60	30	30	..	..	120
190	Acharya Patsala Polytechnic Bangalore	60	30	30	..	..	120
191	B.V. & V.S. Polytechnic, Bagalkot	60	30	30	..	..	120
192	Government Polytechnic, Karwar	..	..	..	..	..	120
193	Government Polytechnic, Belgaum	60	30	30	..	..	120
194	Government Polytechnic, Chickmagalur	60	30	30	..	..	120
195	Polytechnic, Mandya	NA	NA	NA	NA	NA	120
196	Polytechnic, Raichur	NA	NA	NA	NA	NA	120
							2,675
<i>Pondicherry.</i>							
197	Polytechnic, Pondicherry	NA	NA	NA	NA	NA	120
							120
Grand Total							25,597

APPENDIX VII¹

No. 4/1(6)/59-Edn.
GOVERNMENT OF INDIA
PLANNING COMMISSION

UDYOG BHAVAN

New Delhi-2, dated the 17th June, 1959.

OFFICE MEMORANDUM

SUBJECT :—*Manpower requirements relating to the Third Five Year Plan.*

The Working Group on Technical Education has constituted a sub-committee with a view to discussing with Central Ministries their estimates of manpower requirements for the Third Five Year Plan. Shri R. Prasad, Joint Secretary and Director of Manpower, Ministry of Home Affairs, will serve as the convener of the sub-committee which will also include officers from the Planning Commission and the Ministry of Scientific Research and Cultural Affairs. Shri Prasad has been requested to get into touch with different Ministries.

2. The Sub-Committee has drawn up a short check list (enclosed) on reverse setting out points on which Ministries will kindly send information at present available with them. This information may be sent to the Education Division, Planning Commission, with copies to (1) Directorate of Manpower, Ministry of Home Affairs, (2) Ministry of Scientific Research and Cultural Affairs and (3) Perspective Planning and Scientific and Technical Manpower Division of the Planning Commission. It is requested that the information may be sent by the end of June. It is appreciated that at this stage a considerable part of the information will be of a tentative nature and related to specific assumptions. It is hoped, however, that the officers concerned with manpower planning in different Ministries will endeavour to bring together the necessary information and will also indicate points on which they would like to have the provisional suggestions of the Secretariat of the Planning Commission.

Sd.[-

(TARLOK SINGH)

*Additional Secretary to the
Government of India.*

To
All Central Ministries

(APPENDIX VII-2)

Check list for information regarding Manpower Requirements requested from Central Ministries¹

(1) Categories of engineering personnel of various levels such as Post-graduates, Graduates, Diploma holders and Craftsmen, along with basic educational and professional qualifications required.

(2) Number of persons likely to be in position in 1960-61.

(3) Provisional targets of capacity/production proposed for the Third Plan in different fields of development assumed for making estimates of manpower requirements. For major projects break-up may be furnished separately.

(4) Preliminary estimates of investment/outlay required for implementing the targets set out in (3) above.

(5) Additional engineering personnel i.e. Post-graduates, Graduates, Diploma holders and Craftsmen in different fields required to implement the targets in (3) above. The personnel required to replace those in position after 1960-61 as a result of death, retirement etc. may be indicated separately.

(6) Total engineering personnel expected to be in position in 1965-66.

(7) If available, tentative targets of capacity/production and investment proposed for the fourth plan and the personnel requirements including those for replacement.

(8) A short note indicating the assumptions made in making estimates, the action taken or proposed to be taken by the Ministry to train personnel through in-service and practical training etc. and suggestions which they would like to make for augmenting the existing technical education facilities is requested.

APPENDIX VIII

Assumed Targets of output/capacity in the third plan

Serial No.	Ministry	Main Targets indicated (1961-66)
1	2	3
1.	Ministry of Education	265 to 465 multi-purpose schools with technical courses.
2.	Ministry of Labour and Employment	(i) Craftsmen Training Schemes 10,000 additional seats ; (ii) National Apprenticeship Training Scheme 14,000 seats ; (iii) Evening classes for Industrial Workers 12,000 seats ; and (iv) Craft Instructor Training Scheme 2,260 seats.
3.	Ministry of Commerce and Industry	(a) <i>Heavy Electricals, Bhopal.</i> Value of the output per annum: Rs. 25 crores. (b) <i>Public Sector</i> (i) Expansion and development of Heavy Machine Tools ; Foundry and Mining machinery. (ii) Establishment of Heavy Machines Tools, Heavy plate and vessels and structural plant. (c) <i>Private Sector.</i> The outlay assumed is Rs. 1300 crores during the third plan. (d) <i>Small scale Industries</i> The outlay assumed is Rs. 212 crores during the third plan.
4.	Ministry of Railways	(i) Increase in freight traffic 92 million tons (ii) Increase in passenger traffic 20% above the second plan. (iii) Increase in other coaching traffic 15% for non-passenger carrying stock. (iv) New Lines : about 2,000 miles. (v) Electrification : about 1,200 route miles. (vi) Rolling stock ; Locomotives 1936 ; coaching stock 8904, wagons 143882 (includes both replacements and additions).
5.	Atomic Energy	250 M.W. nuclear power.
6.	Ministry of Community Development and Cooperation.	Additional 1600 Blocks.
7.	Ministry of Food and Agriculture. (a) Deptt. of Agri. (b) Deptt. of Food	(a) A continuing annual expansion of agricultural production at the rate of about 5% in the third plan. (b) (i) Add. Sugar Factories : 35 (ii) Installed capacity (sugar) : 3.3 million tons. (iii) Target of production (sugar) : 3.0 million tons.

Serial No.	Ministry	Main Targets indicated (1961-66)
1	2	3
8.	Ministry of Steel, Mines and Fuel	(a) <i>Deptt. of Coal</i> (i) Drills 150. (ii) Targets of Coal Production by the end of the Third Plan : 100 to 120 million tons. (b) <i>Geological Survey of India.</i> The provisional target for Geological mapping during the third plan has been fixed at 155185 Sq. miles. Drilling will also be conducted for base metals and other minerals and metalliferous deposits. (c) <i>Deptt. of Iron and Steel</i> Additional Production capacity of Steel ingots : 4 million tons.
9.	Ministry of Health	1½ to 2 crores of people to be provided with safe water supplies and satisfactory arrangements for excreta and Water disposal.
10.	Ministry of Information and Broadcasting.	Schemes of the All India Radio cannot be defined in terms of any unit. However, a provision of 18.5 crores has been proposed against the likely outlay of Rs. 7½ crores during third plan.
11.	Ministry of Works Housing and Supply.	Construction of Houses : 9,83,000.
12.	C.S.I.R.	Expansion and Development of National Laboratories/Research Institutes.
13.	Ministry of Rehabilitation	Dandakaranya Project.
14.	Ministry of Defence	N. A.
15.	Ministry of Scientific Research and Cultural Affairs.	Construction and development of existing facilities and provision of additional capacity in Degree and Diploma Institutions by 6,000 and 15,000 respectively.
16.	Ministry of Irrigation & Power.	(i) Present aggregate installed generating capacity would grow to about 12.8 million K. W. (ii) Development of hydro-power would continue to predominate over thermal power development. (iii) Important development will take place in transmission grid net work.
17.	Ministry of Transport and Communication. (a) India Meteorological Department.	1. Establishment of 18 additional Radio-sonde/Radar Stations (This includes the production and supply of Radio sonde instruments and accessories at the rate of about 30,000 per year by the end of the Plan.

Serial No.	Ministry	Main Targets indicated (1961-66)
1	2	3
		2. 8 additional Weather Radar Stations. 3. 3 additional sfarics stations. 4. Transmission of Weather hars by Facsimile and their reception at 10 stations. 5. 6 atmospheric electricity stations. 6. Development of a prototype radio- wing finding equipment and the construction of about 10 sets for the gradual establishment of 18 new stations using this and similar equipment. 7. Construction of radiatoes instruments for an additional net work of stations at the rate of about 4 per year. 8. Development of a prototype sfaricst equipment and the construction of about 10 such sets. 9. Modernisation of the departmental workshop and the introduction of quality control in production. 10. Construction of a primary standard Barometer for India. 11. Design and development of : (i) Automatic weather station (ii) Ceilometers. (iii) 5 om. Weather Radar. (iv) Ozone Sonde. (v) Closed Top and base indicator. (vi) Development of Geophysical activities. (vii) Organisation of training section for providing training facilities for new recruits in the field of specialised ments to be used by the department.
	(b) Overseas Communications Services	1. 54 major equipment viz., 16 Transmitters, 18 Receivers and 20 multiplex equipment would be installed. 2. 12 additional telegraph circuits and 8 Radio-photo Services would be establish- ed during the Plan period.
	(c) India Telephone Industries	1. Telephones—2,00,000 Nos. 2. Exchange lines—1,00,000 Nos. 3. Transmission equipment—2000 channels
	(d) Indian Airlines Corporation	1. 30 Dakota aircraft are expected to be replaced by twin Dart engine type of aircraft. 2. Replacement of the present fleet of 5 sky masters by Viscount type aircraft. 3. Purchase of workshops plant, machinery, tools, etc.
	(e) Air-India International.	1. 5 additional Jet aircraft. 2. Construction of additional permanent hanger annexe for workshops. 3. Jet engine overhaul facilities including building. 4. Purchase of workshop equipment to cater for additions and replacements for existing equipment.

1	2	3
(f) Posts & Telegraphs Department		1. Auto exchange system 7,12,000. 2. Manual exchange system 70,000. 3. Carrier equipment 12 channels and 30 channels and single channels—1,396 systems. 4. Co-axial and underground trunk cables 14,000 miles. 5. Trunk Exchange, Tele, etc : 799 bds. 6. Telegraph Officers—1500.
(g) Wireless Planning and Coordination Organisation.		N.A.
(h) Roads Wing		1. National Highways—1,820 miles. 2. State Highway—3,500 miles. 3. Major District Roads—5,480 Miles. 4. Other District Roads—10,170 miles. 5. Classified village Roads—6,830 miles.
(i) Bombay Port-Trust	}	To improve the existing port facilities.
(j) Port of Cochin		
(k) Kandla Port		
(l) Vizagapatnam Port		To handle about 2 million tons of ore and General Cargo in traffic.
(m) Hindustan, Shipyard, Visakhapatnam		To increase the production capacity from 6 to 8 ships per year.
(n) Port of Calcutta		To increase the existing port facilities
(o) Works at Aerodromes		N.A.
(p) Aeronautical Comm. Service		N.A.
(q) Training & Education Organisation		(i) 10 additional Gliding Centres. (ii) 15 new Flying Clubs.
(r) Air Routes and Aerodromes organisation.		(i) Procurement of aerodrome equipment. (ii) Maintenance and operation of Aerodrome equipment.
(s) Research and Development organisation		Undertaking of various research projects.
(t) Aeronautical Inspection Organisation		N.A.
(u) Passenger and Goods Vehicles in India.		(i) Passenger Vehicles : 35,000. (ii) Goods Vehicles. : 12,000.
Ministry of Home Affairs		N.A.

PLANNING COMMISSION

(Education Division) *

APPENDIX D

Additional Requirements of Engineering Personnel during the Third Plan as indicated by the Ministries—Graduates

Head	Outlay for the third plan proposed by Working Groups/ Ministries (Rs. in crores)	Civil	Mechanical	Electrical	Tele-Comm.	Chemical	Metallurgy	Mining	Others*	Total	Remarks
1	2	3	4	5	6	7	8	9	10	11	12
I. Agriculture and Community Development											
(a) Food & Agri. }	1,621	200	150	150	..	..	..		1,102	1,602†	†Includes requirements under minor irrigation also.
(b) Community Development .	..	..	..	..	..	..	..	..	..	..	
TOTAL . .	1,621	200	150	150	..	..	..	..	1,102	1,602	

I	2	3	4	5	6	7	8	9	10	11	12
II. Irrigation and Power	2,084	3,227	871	[3,127	..	..	..	..	..	7,225	
III. Village and Small Scale Industries	330	14	86	54	..	28	..	..	18	200	
IV. Industries and Mining											
(a) Com. & Industry**		420	1,970	500	..	400	380	..	..	3,670	
(b) Steel, Mines and Fuel	2,068	15	2,305	220	..	60	..	3,000	132	5,732	
		24	563	170	..	52	22	..	469	1,300	
(c) Geological Survey of India		..	69	133	..	..	..	..	463	665	
(d) Iron & Steel		400	674	508	..	272	597	80	35	2,566	
TOTAL	[2,068	859	[5,581	1,531	..	784	999	3,080	1,099	13,933	
V. Transport and Communications											
(a) Deptt. of Transport		2,637	43	217	..	..	..	..	44	2,941	
(b) Deptt. of Communications	3,072	384	23	321	3,332	1	3	..	303	4,367	
(c) Railways		520	91	102	83	..	..	..	..	796	
TOTAL	3,072	3,541	157	640	3,415	1	3	..	347	8,104	

APPENDIX IX-2

I	2	3	4	5	6	7	8	9	10	11	12
VI. Social Services											
(a) Education†		200	150	150	..	..	..	..	..	500	
(b) SR & CA ‡		1,260	1,801	2,708	285	350	120	181	350	7,055	
(c) C. S. I. R.		45	60	60	2	50	40	15	70	342	
(d) Home Affairs		43	12	13	10	1	..	..	1	80	
(e) Information and Broadcasting	2,565	3	..	..	307	..	..	..	2	312	
(f) Works, Housing and Supply		550	80	90	..	90	..	..	87	897	
(g) Rehabilitation		40	..	..	..	..	..	..	..	40	
(h) Health		400	..	..	..	..	..	..	..	400	
(i) Labour and Employment		..	468	27	..	..	..	21	..	516	
(j) Atomic Energy		116	3	3	..	..	..	29	303	454	
TOTAL	2,565	2,657	2,574	3,051	604	491	160	246	813	10,596	
VII. Construction Programmes											
		2000	..	1000	..	..	..	..	276	3,276	
Total (Public Sector)	11740 (plus 400 of Inventories)..	12498	9419	9553	4019	1304	1162	3326	3655	44,936	

	1	2	3	4	5	6	7	8	9	10	11	12
VIII. Others . . .			434	513	493	460	..	60	..	..	1,960	
IX. Private Sector												
(i) Industry *** . .		1300	889	6691	3500	..	2217	74	..	782	14,153	
(ii) Housing @ . .		1200	2000	..	500	..	..	..	..	230	2,730	
(iii) Others (Agriculture, Irrigation, Electricity) .		1500	2250	500	2000	..	100	..	..	150	5,000	
Total (Private Sector) .		4000	5139	7191	6000	..	2317	74	..	1162	21,883	
Grand Total (Public, Defence and Private) . . .		16140	18071	17123	16046	4479	3621	1296	3326	4817	68,779	
Percentage to total . .			26.3	24.9	23.3	6.5	5.3	1.9	4.8	7.0	100.0	

*Includes categories of personnel like Sugar, Jute, Leather Technologists and Automobile Aeronautical, Marine and Naval Architecture, Public Health and Sanitary, Architectural and Town Planning, Agricultural Geology/Geophysics/Applied Geology Engineers.

**The Ministry of Commerce and Industry have sent information in regard to the projects : Heavy Machine Building, Foundry Forge Projects at Ranchi, Coal Mining Machinery at Duragpur and Heavy Electricals Corporation, Bhopal. The engineering personnel requirements of Heavy Machine Tools, Heavy Plate and Vessels and Heavy Structural, Hindustan Machine Tools, Fertiliser Plants at Sindri, Nangal have not been sent. In regard to these some rough estimates have been made.

†The Ministry of Education have lumped the requirements and the category-wise break-up has been estimated.

‡The requirements have been estimated in the Planning Commission and generally agreed to by the Ministry of SR & CA

§During the Second Plan the estimated expenditure on buildings and constructions is about Rs. 1,000—12,00 crores (vide para 50 page 22 of Appraisal and Prospects of the Second Five Year Plan) and assuming that there would be comparatively less emphasis on buildings and construction during the Third Plan, the rough estimates of expenditure would be about Rs. 1500 crores or so.

91 The estimates of requirements of engineering personnel have been worked out on this assumption. The Housing Division of the Planning Commission have estimated that the expenditure on Housing Programmes in the private sector during the Second Plan is likely to be of the order of Rs. 800 crores. During the Third Plan an expenditure of Rs. 1200 crores has been assumed and requirements of Engineering personnel estimated on this basis.

***The information has been made available by the Development Wing of the Ministry of Commerce & Industry.

APPENDIX X
PLANNING COMMISSION
(EDUCATION DIVISION)

Additional Requirements of Engineering Personnel during the Third Plan as indicated by the Ministries—Diploma-holders

H:ids	Outlay for third plan proposed by Working Groups/ Ministries (Rs. in crores)	Civil	Mecha- nical	Elec- trical	Tele- Comm.	Chemi- cal	Meta- llurgy	Mining	† others	Total	Remarks.
1	2	3	4	5	6	7	8	9	10	11	12
I. Agriculture and Community Development:											
(a) Food & Agriculture	1621	600	129	..	..	..	..	..	..	729	*In cludes re- quirements under minor irrigation also.
(b) Community Devpt.	1600	..	..	..	..	..	..	..	..	1600	
TOTAL	1621	2200	129	..	..	..	..	..	..	2329	
II. Irrigation & Power											
	2084	8512	1140	5166	..	..	..	..	..	14818	
III. Village & Small Scale Industries											
	330	310	1290	810	..	420	..	..	170	3000	

IV. Industries & Mining:

(a) Comm. & Industry *	630	2900	1080	..	600	570	..	..	5780	
(b) Steel, Minis & Fuel	..	..	..	..	..	..	..	..	..	
(i) Coal	45	1805	1760	..	300	..	7950	..	11860	
(ii) Oil	35	816	702	..	102	..	..	34	1689	
(iii) Geological Survey of India	110	204	20	..	..	..	..	..	334	
(iv) Iron & Steel	2068	100	864	580	..	220	496	..	2260	
TOTAL	2068	920	6589	4142	..	1222	1066	7950	34	21923

V. Transport & Communications:

(a)	Deptt. of Transport	14922	48	40	..	..	..	..	15010
(b)	Deptt. of Comm. & Civil Aviation	298	198	177	82	..	..	27	782
(c)	Railways	3072	1348	148	339	385	..	..	2220
TOTAL		3072	16568	394	556	467	..	27	18012

VI. Social Services:

(a) Education**	247	148	165	..	..	..	..	..	560
(b) S.R. & C.A. @	931	656	614	20	20	15	25	120	2401
(c) C.S.I.R.	55	103	55	..	1	12	..	30	256
(d) Home Affairs	69	16	35	..	..	..	..	..	120

I				2	3	4	5	6	7	8	9	10	11	12
(e) Information & Broadcasting I				2565	..	..	..	..	..	..	..	2	2	
(f) Works, Housing & Supply I					3006	100	258	..	..	..	..	414	3778	
(g) Rehabilitation I					150	..	..	..	..	..	..	..	150	
(h) Health I					1000	..	..	..	..	..	..	..	1000	
(i) Labour & Employment I					20	2307	127	..	..	..	12	2	2468	
(j) Atomic Engery I					125	43	11	..	..	..	15	1	195	
TOTAL				2565	5603	3373	1265	20	21	27	52	569	10930	
VII. Construction Programmes					13760	..	960	..	..	..	..	1680	16400	
TOTAL (Public Sector)				11740 (plus 400 of inventories).	47873	12915	12899	487	1663	1093	8002	2480	87412	
VIII. Others					490	1142	386	278	..	36	..	..	2332	
IX. Private Sector:														
(i) Industry ††					1300	1680	13717	6970	..	2254	143	..	1268	26032
(ii) Housing §§					1200	11808	..	824	..	..	..	..	1442	14074
(iii) Others (Agriculture, Irrigation, Electricity etc.)					1500	4125	750	2250	..	150	..	..	225	7500
TOTAL (Private Sector)					4000	17613	14467	10044	..	2404	143	..	2935	47606

GRAND TOTAL (Public, Defence & Private)	16140	65976	28524	23329	765	4067	1272	8002	5415	137350
Percentage to the Total		48.0	20.8	17.0	0.6	3.0	0.9	5.8	3.9	100.0

† Includes categories of personnel like Sugar, Jute, Leather, Technologists and Automobile, Aeronautics, Marine and Naval Architecture, Public Health & Sanitary, Architectural and Town Planning Engineers.

* The Ministry of Commerce & Industry have sent information in regard to the projects ; Heavy Machine Building, Fourday Forge Projects at Ranchi, Coal Mining Machinery at Durgapur and Heavy Electricals Corporation, Bhopal. The Engineering Personnel requirements of Heavy Machine Tools, Heavy Plate and Vessels and Heavy Structural, Hindustan Machine Tools, Fertiliser Plants at Sindhri, Nangal have not been sent. In regard to these some rough estimates have been made.

++ The Ministry of Education have lumped the requirements and the category-wise break up has been estimated.

@ The requirements have been estimated in Planning Commission and generally agreed to by the Ministry of S.R. & C.A.

§ During the Second Plan the estimated expenditure on buildings and constructions is about Rs. 1000—1200 crores (*vide* para 50, page 22 of Appraisal and Prospects of the Second Five Year Plan) and assuming that there would be comparatively less emphasis on buildings and constructions during the Third Plan, the rough estimates of expenditure would be about Rs. 1500 crores or so. The estimates of requirements of engineering personnel have been worked out on this assumption.

§§ The Housing Division of the Planning Commission have estimated that the expenditure on Housing programmes in the Private Sector during the Second Plan is likely to be of the order of Rs. 800 crores. During the third plan an expenditure of Rs. 1200 crores has been assumed and requirements of engineering personnel estimated on this basis.

†† The information has been made available by the Development Wing of the Ministry of Commerce & Industry

PLANNING COMMISSION
(EDUCATION DIVISION)

Additional Requirements of Craftsmen during the Third Plan as indicated by the Ministries

Engineering Trades

Head	Black-smiths	Carpenters	Draughtsmen (Civil)	Draughtsmen (Mech)	Electricians	Electro Platers	Fitters	Grinders	Linesmen & Wiremen	Mechanists	Mechanic Instrument	Mechanic I.C. Engine
I	2	3	4	5	6	7	8	9	10	11	12	13
I. Agricultural and Community development												
(a) Food and Agriculture	..	..	..	..	..	..	..	..	..	..	..	..
(b) Community Development	..	..	..	..	..	..	..	..	..	..	..	..
TOTAL	..	..	..	..	..	..	..	..	..	..	..	..
II. Irrigation and Power	..	..	..	..	..	..	..	..	..	..	..	..
III. Small Scale Industries	..	..	..	..	..	..	..	..	..	..	..	..
IV. Industries and Mining												
(a) Heavy Electricals, Bhopal	..	..	..	747	..	..	..	..	..	..	..	..

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Engineering Trades

	Mec- hanic Radio	Mec- hanic Mo- tor.	Mou- lders	Pain- ters & Dec- orators.	Patt- ern mak- ers.	Plum- bers.	Sheet Metal work- ers.	Sur- vey- ors.	Tool mak- ers.	Turn- ers.	Watch & clock repa- irers	Wel- ders	Wire- less oper- ators.	Over- seers
	14	15	16	17	18	19	20	21	22	23	24	25	26	27
I. Agriculture & Community Development														
a) Food & Agriculture	.	.	.	.	.	.	.	.	.	.	.	.	.	.
(b) Community Development	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL	.	.	.	.	.	.	.	.	.	.	.	.	.	.
II. Irrigation & Power	.	.	.	.	.	.	.	.	.	.	.	.	.	.
III. Small Scale Industries	.	.	.	.	.	.	.	.	.	.	.	.	.	.
IV. Industries & Mining														
(a) Heavy Electricals, Bhopal	.	.	.	.	.	.	.	.	.	.	.	.	.	.
(b) Public Sector	.	.	.	.	.	.	.	.	.	.	.	.	.	.
(c) Steel, Mines & Fuel	.	.	.	.	.	.	.	.	.	.	.	.	.	.
(i) Coal	.	.	.	.	.	.	.	.	.	2,550	.	.	.	.
(ii) Oils	.	.	.	.	.	.	.	.	.	.	.	.	.	.
(iii) Geological Survey of India	.	.	.	.	.	.	.	.	.	.	.	.	.	.

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Engineering Trades

APPENDIX XI—3

	Die-fitters	Mechanics	Draughtsmen.	Drillers.	Civil— Engg.	Mechanical Engg.	Electrical Engg.	Signalling & Tele- Communica- tions.	Others	Total
	28	29	30	31	32	33	34	35	36	37
I. Agriculture & Community Development										
(a) Food & Agriculture	..		..	..	..	..	..	..	..	..
(a) Community Development . . .	..	..	..	..	..	..	..	..	..	..
TOTAL . . .	..	..	..	..	..	..	..	..	..	..
II. Irrigation & Power .	..	..	..	..	..	..	..	..	73,000	73,000
III. Small Scale Industries .	..	..	..	..	..	..	..	..	11,800	11,800
IV. Industries & Mining .										
(a) Heavy Electricals, Bhopal . . .	..	..	..	..	..	..	..	..	7,509	8,256
(b) Public Sector* .	..	..	..	..	..	..	..	..	67,900	67,900
(c) Steel, Mines & Fuel . . .	..	..	..	..	..	..	..	..	..	..
(d) Coal . . .	..	7000	..	..	..	..	..	..	..	23,600

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* Estimated on the basis of a ratio of 1 : 18 between Engineers & Craftsmen in the manufacturing industries.
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APPENDIX XI-4
Non-Engineering Trades.

Head						Masons	Mistries	Drivers	Others	Total	Grand Total Engg. and Non-Engg. Trades
						38	39	40	41	42	43
I.	Agriculture & Community Development					.	.	.			
	(a)	Food and Agriculture				.	.	.	300	300	[300
	(b)	Community Development				.	.	.	.	.	.
	TOTAL					.	.	.	300	300	300
II.	Irrigation & Power					.	.	.	.	.	73,000
III.	Small Scale Industries					.	.	.	2,33,000	2,33,000	2,44,800
IV.	Industries & Mining.										
	(a)	Heavy Electricals Bhopal				.	.	.	.	.	8,256
	(b)	Public Sector				.	.	.	.	.	67,900
	(c)	Steel, Mines & Fuel				.	.	.	.	.	.
	(i)	Coal				.	.	.	.	.	23,600
	(ii)	Oils				.	.	91	.	91	3,010
	(iii)	Geological Survey of India				.	256	.	.	266	775

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	1	2	3	4	5	6	7	8	9	10	11	12	13
(b) Public Sector*	..	..	..	..	..	..	..	..	..	..	..	..	..
(c) Steel, Mines, and Fuel	..	..	..	..	..	..	..	..	..	..	..	..	..
(i) Coal	4,250	1,400	..	..	7,000	..	..	..	1,400	..	..	..	..
(ii) Oils	..	5	..	..	35	..	..	..	..	..	..	..	..
(iii) Geological Survey of India	..	..	..	..	..	..	..	..	..	..	..	..	..
(iv) Iron & Steel Department	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	4,250	1,405	..	747	7,035	..	..	..	1,400	..	..	..	..
V. Transport and Communications													
(a) Department of Transport	11	31	..	..	34	..	54	..	14	..	..	..	..
(b) Department of Communications and Civil Aviation	20	644	105	3	65	49	63	85	13,102	416	87	65	65
(c) Railways	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	31	675	105	3	99	49	117	85	11,316	416	87	65	65
VI. Social Services													
(a) Education	..	..	..	..	..	..	..	..	..	..	..	..	..
(b) S.R. & C.A.	..	..	..	..	..	..	..	..	..	..	..	..	..

*Estimated figures.

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	14	15	16	17	18	19	20	21	22	23	24	25	26	27
(iv) Iron & Steel Department	..	..	..	..	..	..	..	..	..	..	..	..	..	..
TOTAL	..	..	..	..	..	..	..	..	..	2,550	..	..	..	..
Transport & Communications.														
(a) Department of Transport	..	..	I	14	..	..	..	..	..	41	..	128	..	..
(b) Department of Communication & Civil Aviation	274	5	24	15	..	..	33	..	50	66	7	25	10	..
(c) Railways	..	..	..	..	..	..	..	..	..	..	..	..	..	..
TOTAL	274	5	25	29	..	..	33	..	50	107	7	153	10	..
VI. Social Services														
(a) Education	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(b) S.R. & C.A.	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(c) C.S. & I.R.	24	..	6	7	11	5	14	2	10	22	3	16	1	4
(d) Home Affairs	..	..	9	12	2	..	4	1	4	4	..	5	7	6
(e) Information & Broadcasting	..	..	..	2	..	..	..	..	..	..	..	..	..	..
(f) Works, Housing and Supply	..	..	..	..	..	..	..	..	..	..	..	I	..	..
(g) Rehabilitation	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(h) Health	..	..	..	..	..	..	..	..	..	..	..	..	..	..
(i) Labour & Employment	..	185	216	..	94	..	..	177	..	467	..	528	..	..

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	28	29	30	31	32	33	34	35	36	37
(ii) Oils	..	69	..	..	..	..	..	..	2,810	2,919
(iii) Geological Survey of India	..	..	..	250	..	..	..	..	259	509
(iv) Iron & Steel De- partment	..	..	..	..	..	..	..	..	8,000	8,000
TOTAL	..	7,069	..	250	..	..	..	..	86,478	11,184
V. Transport & Communi- cations.										
(a) Department of Tra- nsport	..	52,018	8	..	..	..	..	..	1,85,964	2,38,318
(b) Department of Co- mmunications & Civil Aviation . .	13	13,528	78	..	..	..	..	..	2,044	30,930
(c) Railways . . .	..	..	..	..	3,300	22,800	4,400	2,400	..	32,900
TOTAL	13	65,600	86	..	3,300	22,800	4,400	2,400	1,88,008	3,02,148
VI. Social Services.										
(a) Education . . .	..	..	..	..	..	..	..	..	..	..
(b) S. R. & C.A. . .	..	..	..	..	..	..	..	..	..	..
(c) C.S. & I.R. . .	8	71	..	..	..	..	..	..	234	666
(d) Home Affairs . .	..	5	2	..	..	..	..	..	..	118
(e) Information and Broad- casting	..	4	..	..	..	..	..	..	..	8

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	38	39	40	41	42	43
(iv) Iron & Steel Department	..	..	..	11,824	11,824	19,824
TOTAL	..	266	91	11,824	12,181	1,23,365
V. Transport & Communications.						
(a) Department of Transport	13	..	1,72,089	268	1,72,370	410,688
(b) Department of Communication and Civil Aviation . .	..	3,000	1,311	5	4,376	35,306
(c) Railways	..	..	..	..	..	32,900
TOTAL	13	3,060	1,73,400	273	1,76,746	4,78,894
VI. Social Services.						
(a) Education	..	..	..	..	..	Nil
(b) S.R. & C.A.	..	..	..	..	..	Nil
(c) C.S. & I.R.	..	..	..	43	43	709
(d) Home Affairs	..	..	..	195	195	313
(e) Information & Broadcasting	..	..	..	..	..	8
(f) Works, Housing & Supply	25,125	1,582	..	3	26,710	45,981
(g) Rehabilitation	..	..	27	4	31	47
(h) Health	..	..	..	..	..	300
(i) Labour & Employment	..	..	..	712	712	8,739

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1	2	3	4	5	6	7	8	9	10	11	12	13
(c) C.S. & I.R. . . .	4	22	5	42	33	3	50	7	10	19	18	8
(d) Home Affairs . . .	8	2	10	4	8	2	17	4	2	..	..	..
(e) Information and Broad- casting	..	2	..	..	..	..	..	..	..	..	..	..
(f) Works, Housing and Supply	1	15,001	..	..	..	..	4,250	..	..	..	..	..
(g) Rehabilitation . . .	..	..	..	..	..	..	..	..	..	..	..	..
(h) Health	..	..	..	..	..	..	..	..	..	..	..	..
(i) Labour and Employ- ment	267	287	382	348	533	..	799	..	251	281	..	..
(j) Atomic Energy . . .	3	..	..	..	3	..	4	..	..	..	..	..
TOTAL	283	15,314	397	394	577	5	5,120	11	263	300	18	8
TOTAL PUBLIC SECTOR . . .	4,564	17,394	502	1,144	7,711	54	5,237	96	14,779	716	105	73
Housing*	..	72,000	..	..	..	..	20,000	..	..	..	..	..
Private Sector†	..	..	..	..	..	..	..	..	..	..	..	..
Industry	..	..	..	..	..	..	..	..	..	..	..	..
Defence	..	..	..	..	..	..	..	..	..	..	..	..
GRAND TOTAL	4,564	89,394	502	1,144	7,711	54	25,237	96	14,779	716	105	73

*Estimated on the basis of an outlay of Rs. 1200 crores for the Third Plan period.

†Estimated figures for chemical industries in the private sector.

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	14	15	16	17	18	19	20	21	22	23	24	25	26	27
(j) Atomic Energy	..	..	..	..	.	..	..	8	..	..	..	2	..	..
TOTAL	24	192	231	21	107	5	18	188	14	493	3	552	8	10
TOTAL PUBLIC SECTOR	298	197	256	50	107	5	51	188	64	3,150	10	705	18	10
Housing	..	..	..	..	..	..	..	..	..	..	..	..	..	.
Private Sector	..	..	..	..	..	..	..	..	..	..	..	..	.	..
Industry	..	..	..	..	..	..	..	..	..	..	..	..	.	.
Defence	..	..	..	..	..	..	..	..	..	..	..	..	..	..
GRAND TOTAL	298	197	256	50	107	5	51	188	64	3,150	10	705	18	10

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	28	29	30	31	32	33	34	35	36	37
(f) Works, Housing & Supply	..	13	..	..	..	.	..	..	5	19,271
(g) Rehabilitation	.	1	..	..	..	..	..	..	15	16
(h) Health	.	..	..	..	..	..	..	..	300	300
(i) Labour & Employment	..	..	..	..	..	..	..	.	3,212	8,027
(j) Atomic Energy	..	35	.	..	..	.	..	..	..	55
TOTAL	8	129	2	..	..	..	..	..	3,766	28,461
Public Sector	21	72,798	88	250	3,300	22,800	4,400	2,400	3,63,052	5,26,593
Housing	..	..		..	..	..	..	..	..	92,000
Private Sector	..	..	..	..	..	.	..	..	3,83,900	3,83,900
Industry	..	..	..	..	..	..	..	..	..	N.A.
Defence										
GRAND TOTAL	21	72,798	88	250	3,300	22,800	4,400	2,400	7,46,952	10,02,493

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	38	39	40	41	42	43
(j) Atomic Energy	..	..	..	306	306	361
TOTAL	25,125	1,582	27	1,263	27,997	56,458
TOTAL PUBLIC SECTOR	25,138	4,908	1,73,518	2,46,660	4,50,294	9,76,817
Housing	1,20,000	7,400	..	..	1,27,400	2,19,400
Private Sector	..	..	..	..	..	3,83,900
Industry	..	..	..	..	..	N.A.
Defence	..	..	..	..	..	..
GRAND TOTAL	1,45,138	12,308	1,73,518	2,46,660	5,77,624	15,80,117

APPENDIX XXII
PLANNING COMMISSION
 (Education Division)

Category-wise distribution of Engineers—1956-66.

DEGREE

Category	1955-56 (Position)	%age to Total	1956-61		1956-61		1960-61		1960-61	
			Additional require- ments according to E.P.C. Report	%age to Total	Strength Added	%age to Total	Position (Cols 2 + 6)	%age to Total	Position according to E.P.C. Report (Cols. 2 + 4)	%age to Total
I	2	3	4	5	6	7	8	9	10	11
1. Civil	13,200	42.3	12,354	43.6	9,794	37.2	22,994	40.0	25,554	42.9
2. Mechanical	6,800	21.8	5,300	18.7	4,745	18.1	11,545	20.1	12,100	20.3
3. Electrical	7,300	23.4	5,546	19.6	4,615	17.5	11,915	20.7	12,846	21.6
4. Chemical	2,496	8.0	2,256	8.0	1,060	4.1	3,556	6.2	4,752	8.0
5. Metallurgy	593	1.9	693	2.4	475	1.8	1,068	1.9	1,286	2.2
6. Mining	343	1.1	469	1.7	697	2.6	1,040	1.8	812	1.4
7. Tele-Comm.	281	0.9	1,616	5.7	723	2.7	1,004	1.7	1,897	3.2
8. Others	187	0.6	91	0.3	4,199	16.0	4,386	7.6	278	0.4
TOTAL	31,200	100.0	28,325	100.0	26,308	100.0	57,508	100.0	59,525	100.0

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DIPLOMA

1. Civil	.	.	.	27,700	58.2	29,013	53.9	16,802	51.7	40,502	55.3	52,713	55.8
2. Mechanical	.	.	.	7,900	19.4	12,192	22.7	4,781	14.7	12,681	17.3	20,092	21.3
3. Electrical	.	.	.	7,500	18.4	10,355	19.2	3,626	1.12	11,126	15.2	17,855	18.9
4. Chemical	.	.	.	407	1.0	806	1.5	32	0.1	439	0.6	1,213	1.2
5. Metallurgy.	.	.	.	244	0.6	204	0.4	232	0.7	476	0.7	448	0.5
6. Mining	.	.	.	407	1.0	629	1.2	589	1.4	996	1.4	1,036	1.0
7. Tele-Comm.	.	.	.	8	0.02	608	1.1	550	1.7	558	0.8	616	0.7
8. Others	.	.	.	534	1.4	21	0.04	5,896	18.1	6,430	8.7	555	0.6
TOTAL	.	.	.	40,700	10.00	53,828	100.0	32,508	100.0	73,208	100.0	94,528	100.0

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DEGREE

	1961-66		1965-66		1961-66		1965-66		Remarks
	Strength to be added†	%age to total	Position§ (Cols. 8+12)	%age to total	Strength proposed to be added§§	%age to total	Position** (Cols. 8+16)	%age to total	
	12	13	14	15	16	17	18	19	
1. Civil	16,700	32.3	39,694	36.3	12,500	27.4	35,494	34.4	†Actual supply of engineering personnel during 1961-66.
2. Mechanical	13,000	25.1	24,545	22.5	11,500	25.3	23,045	22.4	
3. Electrical	12,700	24.5	24,615	22.5	11,000	24.1	22,915	22.2	
4. Chemical	2,300	4.5	5,856	5.4	2,300	5.1	5,856	5.7	§§Requirements of Engineering personnel assessed during 1961-66.
5. Metallurgy. . . .	1,000	1.9	2,068	1.9	1,100	2.4	2,168	2.1	
6. Mining	1,500	2.9	2,540	2.3	1,800	4.0	2,840	2.8	**Position according to the strength proposed during 1961-66.
7. Tele-Comm. . . .	2,100	4.1	3,104	2.8	2,500	5.5	3,504	3.4	
8. Others	2,440	4.7	6,826	6.3	2,840	6.2	7,226	7.0	§The actual likely position according to the supply of engineering personnel during 1961-66. There may be some
TOTAL	51,740	100.0	1,09,248	100.0	45,540	100.00	1,03,048	100.0	

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DIPLOMA

											minor variations between various ca- tegories of person- nel as a result of the recommenda- tions made in the Chapter but these will be only of mar- ginal nature.
1. Civil	.	.	40,000	49.1	80,502	52.0	40,000	50.0	80,502	52.5	
2. Mechanical	.	.	17,000	20.9	29,681	19.2	17,500	21.8	30,181	19.7	
3. Electrical	.	.	13,000	16.0	24,126	15.6	14,000	17.5	25,126	16.4	
4. Chemical	.	.	100	0.1	539	0.4	@	..	@		
5. Metallurgy.	.	.	600	0.7	1,076	0.7	800	1.0	1,276	0.8	
6. Mining	.	.	1,500	1.8	2,496	1.6	4,000	5.0	4,996	3.3	
7. Tele-Comm.	.	.	1,000	1.2	1,558	1.0	500	0.6	1,058	0.7	
8. Others	.	.	8,300	10.2	14,730	9.5	3,300	4.1	10,169	6.6	
TOTAL	.	.	81,500	100.0	1,54,708	100.0	80,100	100.0	1,53,308	100.0	

@ Included under others.

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