



**GOVERNMENT OF BIHAR
EDUCATION DEPARTMENT**

Report
of the
**Job-orientation Education Committee
Bihar**

Volume II

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INTRODUCTION

As mentioned in introduction to volume I of the report of the Committee submitted to the State Government on the 5th February 1975, although the State Government constituted the Committee on the 1st August, 1974 and the Chairman assumed charge of his office on the 17th August 1974, the staff and funds required for the Committee were sanctioned on the 1st October 1974. The Committee submitted volume I of its report on—

- (i) School Education,
- (ii) Vocational Education, and
- (iii) Teacher Education

within the first six months from the date of the constitution of the Committee and within about four months of its effective working

2. In this volume (volume II) of the report, the Committee has considered and made recommendations on the following topics:—

Topics.	Chapter.
(i) Higher Secondary/Post-Secondary Education (Academic Stream).	VI
(ii) Teaching methods and evaluation (School and Higher Secondary Education).	VII
(iii) Higher Education	VIII
(iv) Engineering Education	IX
(v) Education of the degree and post-graduate degree levels for Agriculture and Animal Husbandry.	X
(vi) Medical Education	XI
(vii) Method of teaching and evaluation (higher education) ...	XII
(viii) Miscellaneous including	XIII
(a) Correspondence Course,	
(b) Social Service,	
(c) Requirements of Degrees, Diplomas and Certificates for employment, and	
(d) Training for self-employment and entrepreneurship.	
(ix) Machinery for implementation	XIV
(x) General Observations	XV

3. With submission of the second volume of the report, the Committee has completed its main work. At the request of the Committee, A. N. Sinha Institute for Social Studies has taken up the investigation and study of two Development Blocks, namely, Mushahari Block in the district of Muzaffarpur in North Bihar and Chandi Block in the district of Nalanda in South Bihar, with particular reference to occupational pattern and economic activities, existing facilities for education and the specific educational facilities and vocational training required in these Blocks. Funds for study and investigation have been made available by the Committee and the Indian

Council of Social Sciences and Research. The results of investigation and studies are expected by October, 1975. The Committee will meet once or twice to consider the results of investigations by the Institute and make, if necessary, further recommendations regarding vocational training and change in the educational pattern in the rural areas in the light of the results of its investigations and studies. It will, however, not be necessary for the Committee to have a whole-time Chairman and staff for this purpose. The State Government have been requested to consider extension of the term of the Committee till December, 1975 for this purpose. No additional expenditure except for a small sum which may be required for payment of T. A. to the members who may come from outside the State will be required for extension of the term of the Committee till December, 1975. This small amount can be met out of the savings from the funds already sanctioned for the Committee. In fact, there has been large savings from the funds of the Committee. In view of the fact that services of competent staff could not be made available for filling up even the staff sanctioned for the Committee, it had to work with a very small staff.

4. The Committee held eleven meetings between September, 1974 to July, 1975. In addition, the Committee visited Industrial and Mining areas of South Bihar from the 22nd June 1975 to 27th June 1975 and had meetings and discussions with the representatives of prominent employers of the public and private sectors, industrial and mining concerns.

Dr R. C. Mehrotra, could not attend any of the meetings of the Committee and has not signed the report. All the other members including co-opted members have signed the report.

RAMANAND SINHA

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SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS.

CHAPTER VI.

POST-SECONDARY EDUCATION (ACADEMIC STREAM).

1. Higher Secondary two-year academic course is a preparatory course for admission to the undergraduate courses in Arts, Science and Commerce and to the professional courses in Engineering, Technology and Medicine. In view of the large number of unemployed university graduates and undergraduates in the country, views were expressed in the document relating to the "Approach to the Fifth Five-Year Plan", that the problem of the educated job-seekers should be solved by operating not only on the demand side, but also by regulating the university education, particularly in the case of generalists, so as to conform to a likely quantum and pattern of employment opportunities for the educated youths. Even in report of Robbin's Committee on Higher Education (Great Britain) "instructions in skill suitable to play part in the general division of labour" were mentioned as the first aim and objective of education, although it also listed (a) promotion of general powers of mind, (b) advancement of learning, and (c) transmission of a common culture and common standard of citizenship as the other important objectives.

2. In the UNESCO World Year Book of Education (1972-73) in the topic entitled "Universities facing the future", it has been mentioned, among other things, that the Government and community see the universities as sizeable investment in the human resources of the future, students see it as a place where they spend valuable years of their early adult life in the hope that these will be relevant to their life styles as they see them and the employers look to the universities to provide young people who can do the job they want to be done. In other words, higher education should be related to meaningful social and economic activities (6.1 to 6.5).

3. As already discussed in Chapter I of the report, the numbers of job-seekers who are graduates and undergraduates are much larger than the jobs available and in the context of existing development in education and social and economic activities, this position is likely to continue for some years.

4. The University Grants Commission, in its report for the year 1972-73, observed that the growth rate of enrolment at the university level courses has outstripped in the growth rate of national economy and much of the higher education, both in academic and professional courses is not relevant to the needs, abilities and aptitudes of the students, and the needs of the country's developing economy. Existing system of higher education is generating much wastage and stagnation.

5. About 86 per cent of the students in the colleges of the State study courses in Arts, Science and Commerce faculties. If massive employment has to be avoided, higher education including higher secondary academic stream has to be so planned and regulated so as to conform increasingly to the likely quantum and pattern of employment position for the educated youths, subject to equality of opportunities for sons and daughters of economically and socially disadvantaged persons.

6. Investment in higher education irrespective of its contributions to the economic and social activities results in corresponding lower investment in the economic and

social activities which create jobs for educated persons. Unplanned and unrestricted growth of higher education has also resulted in deterioration in the quality of education. In the circumstances, the first step to be taken for purposeful planning of higher education is to prevent the opening of new colleges of Arts, Science and Commerce, except on the basis of genuine and felt needs for which necessary planning has to be done by the Government in consultation with the universities. The Committee, therefore, strongly recommends that the State Government should prohibit, by legislation, the establishment of any new college except on the basis of a plan, approved by the State Government to meet the economic and social needs (6.6—6.15).

7. On the basis that about 50 per cent of the total students appearing at the secondary school examination, passing that examination, the Committee recommends that the higher secondary academic courses may be conducted in about 1/7th of the secondary schools. The secondary schools in which these courses should be located should be those which have adequate facilities in respect of accommodation (both teaching accommodation and hostel accommodation), play field, library, laboratories, equipment and staff, each of which has not less than 400 students on its roll in classes VIII to X and which have adequate scope for development.

8. With the introduction of higher secondary academic courses Intermediate courses in the colleges will be abolished. If, for financial and other reasons, it becomes necessary to locate higher secondary academic classes in the same campus as the college, they together with secondary classes should constitute as a unit separate from the college.

9. In the location of the higher secondary academic classes (XI and XII) due consideration should be given to the requirements of different areas so that there may be equitable and fair distribution of the higher secondary schools in the State including those areas of Chotanagpur and Santhal Parganas and other districts in which the density of population is low.

10. Location of higher secondary academic schools should be planned jointly by the Government and the Board of Secondary/Higher Secondary Education (6.16—6.22).

11. While students of the present Intermediate courses in Science remain engaged for 5-6 hours in the college, a student of Arts or Commerce subjects remain engaged in the class work for about 3 hours. It is necessary that students in higher secondary courses in Arts and Commerce should be kept engaged in schools for at least 4½ hours. The Committee recommends that the students of even Arts and Commerce courses should be taught at least for even 24 hours a week; each period should be of one hour's duration. The effective working days in a year should not be less than 230 days (6.23-6.24).

12. Teachers of higher secondary classes should possess second class degrees in the relevant subjects, preference being given to those who have passed with Honours in the relevant subjects in the degree courses. The teachers should draw pay in the scale of Upper Division of the Bihar Education Service. Principals of Higher Secondary Schools should get pay in the pay-scale of Bihar Education Service, class II plus a special pay of Rs. 150 a month (6.25-6.26).

13. The aim of the three-year degree course of the national pattern of education of 10+2+3 is to raise the standard of education at the degree level so as to enable a

student to study in some depth the subjects he chooses and the aim of the 2-year higher secondary academic courses is to enable him to prepare by study in some depth of the subjects which he has studied at the secondary level or some new subjects for admission to the degree courses. While agreeing, in principle, with the suggestions by the Education Commission (1964-65) that the study of the main language continues at the higher secondary stage, but the students should have a wide choice of subjects from the groups of the humanities and sciences, social sciences, arts and crafts work, the Committee recommends that the scheme of study and examination for the higher secondary academic courses should include compulsory study of (1) Hindi (one paper of 100 marks), (2) English (one paper of 100 marks), and any of the four subjects of two papers each with 100 marks from the groups of (A) Language, Literature, and Humanities, (B) Social Science, (C) Sciences, and (D) Physical Education, Military Science, Painting, Sculpture and Music.

A student who wants to take an additional fifth subject may be allowed to do so. While theoretically a student may be free to choose any four subjects from different groups of combination of subjects for study, combinations of subjects for study will have to be arranged in such a way that the requirements regarding study of subject for admission to undergraduate courses and professional courses are satisfied. The Committee considers that only those students who are not below the average grade or who have secured 45 per cent marks in the aggregate in the secondary examination should be admitted to the higher secondary academic courses. If, however, candidates belonging to the Scheduled Castes and Scheduled Tribes fail to get admission on the basis of this criteria to the extent of places reserved for them, the standard of admission may be relaxed and the candidates of those classes who are near the average or who have secured up to 40 per cent marks may be admitted to make up the shortfall.

There should be a public examination at the end of the 2-year higher secondary academic courses (6.27—6.32).

14. The contents of the courses of the higher secondary academic classes (XI and XII) should be such as to enable the students to acquire breadth of knowledge and skills in various disciplines which they may choose to study and prepare them for studying the courses of the upgraded 3-year degree course. The details of the courses should be prepared by the Board of Secondary and Higher Secondary Education in consultation with the State Council of Educational Research and Training and Bihar School Examination Board. While the contents of the courses must reflect the social, economic and cultural environment of the State, they should favourably compare with the standard achieved in the developed countries. As an interim measure, the courses of studies prescribed by the Patna University for Intermediate classes may be adopted for higher secondary class, but the revision of courses should be taken up at the earliest opportunity.

15. Higher secondary education should be regulated by a reorganised Board of Secondary and Higher Secondary Education.

16. *Suitable job-opportunities for higher secondary school certificate-holders.*— Recruitment to the Armed Forces, Competitive Examinations held by the Union Public Service Commission for admission to National Defence Academy, Indian Army and Indian Navy, training of officers for the defence forces provide suitable opportunity for those who hold higher secondary school examination certificates. Candidates for these

examinations are examined in English, General Knowledge I and II (which includes questions of Physics, Chemistry and General Sciences and Social Studies, Geography and current events), and Mathematics I and Mathematics II. Suitable combinations of subjects should be provided in at least some of the higher secondary courses for enabling the candidates who want to enter the commissioned ranks of the Armed Forces to compete for admission to the Training Institutions set up for the training of officer-cadets.

17. A student whose achievement is high in the N.C.C. has greater chance for entering the commissioned rank of the Armed Forces; even otherwise, the N.C.C. is a youth moment which promotes the qualities of leadership, discipline, self-reliance, devotion to duty, etc., which are pre-requisites for success in many other walks of life. The Committee recommends that the N.C.C. should be strengthened in the universities and colleges of the State and Senior Wing of the N.C.C. should be introduced in the higher secondary school when they are organised.

18. A Sainik School has been set up in the State with the joint efforts of the Central and State Governments. This school prepares students for secondary/higher secondary examinations of the Central Board of Education with particular emphasis on the requirements for admission to the National Defence Academy/Indian Military Academy examinations.

The number of students from the State qualifying for admission to Sainik School is much larger than the number of places available in only one Sainik School. If and when funds are available, establishment of a second Sainik School in the State may be considered. In the meantime, co-curricular activities on the lines of those introduced in Sainik School may be introduced in some of the selected schools which have facilities for such co-curricular activities, and assistance of army officer working in the N.C.C. for developing and conducting these activities may be taken (6.33—6.45).

19. A pass in higher secondary examination followed by training in relevant branch will meet the requirements of some of the Junior Supervisory courses under the State Government for recruitment to which a degree is the minimum qualification at present. The Committee recommends that the State Government may review the minimum qualification for recruitment to such posts and, wherever necessary, reduce the minimum qualification for recruitment (6.46-6.47).

20. Some students who show proficiency in games and sports are likely to find employment not only as Physical Instructors in schools and colleges but also in industrial and commercial concerns in the public and private sectors. The Government of India has formulated a scheme for setting up such schools in the different regions of the State. The State Government has already taken up with the Government of India a proposal for locating one of such schools in the State. This should be pursued. In the meantime, some schools which have been doing good work in developing talents in certain games should be selected and provided adequate facilities for organising training programmes under proper guidance and suitable coaches for selected students from different regions.

CHAPTER VII.

TEACHING METHODS AND EVALUATION.

21. Quality of education depends not only upon the contents of courses of studies but also on the method of teaching which is very closely related to the system of evaluation.

Complaints have been made against the traditional system of external examinations and suggestions have been made for replacement of the system by traditional examination system by an assessment which should aim at continuous internal evaluation. The experience of interval evaluation introduced, on a limited scale, in the Secondary School Examination in fifties was not at all happy. It led to abuses on a very wide scale and had to be given up. It has been noticed that even in the traditional system of examination students fare better in those schools where teachers are well motivated and take interest in teaching.

Teachers who take initiative and carry out innovation in teaching methods should be encouraged and the State Council of Educational Research and Training, with the help of Training Colleges, should train teachers in new methods of teaching which are found to be useful. Suitable and proper methods of teaching should be incorporated in the guide books which are used by the teachers (7.1—7.5).

22. Suitable text-books should be prepared and made available for satisfactory teaching. Bihar Text-Book Corporation which has published only few text-books for the existing classes X and XI should publish text-books for all the classes and all the subjects of the secondary schools. The books prepared and published by the National Council of Educational Research and Training may be used with such adaptations as are necessary in the context of the conditions prevailing in the State. State Council of Educational Research and Training should be more actively associated with such adaptations. The best teachers and experts should be engaged to write text-books on different subjects. No text-books other than those published by the Bihar Text-Book Corporation or National Council of Educational Research and Training should be allowed to be used in the schools and punitive action should be taken against the teachers and the schools who persist in using the text-books other than those approved for use in schools (7.7-7.8).

23. *Evaluation.*—Continuous internal evaluation is no doubt a very satisfactory method of evaluation, but, as already mentioned, experience of its application on a limited scale in 1950's led to abuses on a wide scale. For successful implementation of continuous internal system of evaluation, teachers of integrity and devotion are required. The Committee recommends that, in the prevailing atmosphere public examination should continue, as at present, at the end of the secondary school stage and at the end of each academic year of the higher secondary academic and the higher secondary vocational courses. But internal evaluation should be used as complement to the external examination and for regulating promotion of students from one class to another in the schools.

The Committee recommends that the internal evaluation in the school should be based on the performance of the students in classes, their study and home work done outside school hours, periodical examinations to be held on every Saturday and two examinations—one to be held at the mid-term and the other to be held at the end of the term. Overall performance of the students at the end of the academic term, as indicated by the cumulative results of the assessments, should be recorded in the comprehensive card to be maintained for each student. The school complexes, wherever they exist, should be associated with internal evaluation and should conduct the mid term and annual examination of the schools (7.9—7.19).

24. The public external examination at the end of the secondary stage and at the end of each academic term of the higher secondary academic and vocational courses should be conducted by the Bihar School Examination Board and the State Council of Vocational Education respectively. The suggestion that these bodies should maintain 'question bank' is attractive, but before it is adopted on a wide scale, it should, in consultation with the State Council of Educational Research and Training, be tried by Bihar School Examination Board on a pilot basis. The questions in the 'question bank' should consist of problem questions, essay type questions and short type and objective type questions. Teachers should be trained in the methods of setting such questions.

25. Bihar School Examination Board should also give detailed instructions regarding internal evaluation and the format of the comprehensive card to be maintained for each student in the school. Courses pertaining to the method of teaching in the Training Colleges should include training in setting questions and evaluation of answers (7.20—7.24).

26. *Grade system.*—The Committee recommends that performance of students in the external examination and internal evaluation should be judged not on the basis of marks but on the basis of 9 grades (grade 1—9) which should be later reduced to 6 grades of (a) outstanding, (b) very good, (c) good, (d) satisfactory (e) fair and (f) poor, as indicated in paragraph 7.25. The teachers should be trained in the method of evaluation on the basis of grades. After the introduction of grade system no candidate will be formally declared to have passed or failed in the examination, but the universities and other higher educational and vocational and professional institutions will prescribe, by regulations, conditions for admission into them. Similarly, Government will have to prescribe the minimum qualifications in terms of grades for employment in various jobs (7.26—7.28).

27. The Committee agrees with the decision of the State Government that in the first stage 50 to 100 selected secondary schools which have good reputation should be allowed to introduce internal assessment as supplement to the external examination. The achievements of the students in internal evaluation should be shown in a parallel column in the certificates to be issued by the Bihar School Examination Board. The certificate will show the results of both internal and the external examinations in two separate columns. The performance of the selected schools should be evaluated by a committee of experts and schools other than those initially selected, who want to adopt the internal assessment of evaluation, as a supplement to the external examination, should be inspected by the committee of experts and those which are recommended by this committee may be allowed to adopt internal system. Their performance should also be evaluated periodically (7.29—7.31).

28. External examination to be held on the completion of the secondary stage should be held at two stages. Examination in the second Indian language, and work experience (theoretical and practical) should be held at the end of class IX or during the mid-term in class X. There should also be internal practical tests of physical activities. External examination in the remaining subjects should be held on completion of class X.

As already recommended external examination should be held at the end of each academic term of the higher secondary academic and vocational courses. These external examinations should be supplemented by assessment of the performance of the students in classes, in home assignments and one mid-term internal assessment (7.32-7.33).

29. The Bihar Secondary School Examination Board will have to take much greater initiative and play active role in the matter of reforms in the examination system suggested by the Committee in this Chapter.

CHAPTER VIII.

HIGHER EDUCATION.

30. Job-oriented higher education implies that education imparted should be of some practical use. Job-oriented higher education includes not only professional courses in law, medicine and engineering, applied commerce, etc., but also the courses in the humanities, social science and natural sciences which enable young people to acquire knowledge and skills which may help them in entering Civil Service, teaching professions or industries or business or in self-employment (8.1).

31. *Civil Service under the Central and the State Governments.*—(i) Recruitment to many of the positions is made on the basis of competitive examinations including *viva voce* tests or interviews. Recruitment to the commissioned rank of the various branches of the Armed Forces provides employment to an appreciable number of degree holders. A number of holders of post-graduate degrees in various disciplines find employment as teachers in the colleges and universities and a number of graduates in various subjects with degree in education find employment as teachers in Government or non-Government schools.

(ii) Degree and Post-Graduate degree holders in Agriculture and Animal Husbandry and Veterinary Science are mostly employed under the State and Central Governments, although some of them are employed by Banks in connection with promotion and processing of credit for agricultural operations.

(iii) A number of Civil Engineering graduates find employment under the State and Central Governments; some are employed by Industrial and other concerns.

(iv) Graduates in medicine are mainly employed by State Government to man their health and medical services or as teachers in medical colleges; some are employed in medical establishments of industries and commercial concerns; and some medical graduates and post-graduates take up self-employment (8.2—8.7).

32. The following categories of persons with higher education find employment in varying numbers in industrial and business organisations :—

- (i) Persons with degree and diploma in Personnel Management and Industrial Relations;
- (ii) Persons who specialise in and obtain degrees or diplomas in business economics, finance, cost and accounts;
- (iii) Persons with specialisation/degrees/diplomas in (a) Marketing, (b) Production Control/Operational Management, (c) Quantitative methods, and (d) General Management.

Many of the public sector undertakings and some of the bigger private undertakings recruit graduates in various disciplines as executive trainees and train them for various jobs (8.8—8.9).

33. The existing position of employment and employment potentials of degree and Post-Graduate degree holders in various sectors of employment may be summed up as follows :—

- (a) *Agriculture.*—Graduates in Agriculture who come from landowners' families can find self-employment in agriculture which has to be modernised to meet the needs of the country. Some agricultural graduates with practical experience will be required to work as teachers in Polytechnics.

- (b) *Mining*.—Mining is a sizeable sector in the State which produces about 39 per cent of the minerals produced in the country. The nationalised sectors of coal-mining are being increasingly mechanised and some persons possessing degrees in Mining Engineering a few with degrees in Mechanical and electrical engineering, and some with degrees relevant to ancillary activities like personnel management, sales, material management, etc. may find employment in coal-mines.
- (c) *Manufacturing industries*.—There is considerable scope for development of small-scale industries in the State which can provide self-employment to a number of graduates in various disciplines who possess qualities of entrepreneurship, self-confidence, knowledge of market and the qualities required for co-ordinating production, marketing and finance.
- (d) *Construction*.—There is scope for self-employment as contractors in activities relating to construction for Civil Engineering Graduates and others (8.13).
- (e) *Trade, Commerce and Banks*.—With trade is largely self-employment sector to which degree holders of the State are not attracted. Banks employ a number of degree holders as Executive Personnel who are recruited mostly on all-India Competitive Examinations. Some graduates with degree in Commerce or in other disciplines are recruited to subordinate positions in Banks.
- (f) *Transport*.—There is scope for self-employment in transport sectors, but degree holders of the State are not attracted to it (8.10—8.15).

34. Some of the specific positions for which there is scope for employment in varying degrees and for meeting the demand for which undergraduate and post-graduate courses may be introduced in the colleges and the universities of the State are mentioned below :—

Employment positions	Courses to be introduced or reorganised in the universities
1	2
1. Accountants, Auditors Company Secretaries.	Chartered Accountants, Costs and Works Accountants are not available in required numbers in the State. There is sufficient scope for their employment. Commerce courses should be reorganised in the light of requirements for the examinations for Chartered Accountants, Cost and Works Accountants and Company's Secretaries conducted by respective professional institutes.
2. Biochemists	... A Post-Graduate Degree Course in Biochemistry may be introduced in Patna University.

Employment positions	Courses to be introduced or reorganised in the universities
1	2
3. Industry	A Post-Graduate Diploma in Book Industry including courses of studies relating to printing and production, marketing and sales promotion, Accountancy and Library Science should be introduced in Patna University.
4. Computer operation and data processing.	Diploma and certificate courses should be introduced in computer operation and data processing in Patna and Ranchi Universities.
5. Dentists	The college of dentistry at Patna may be expanded to provide for a larger intake of students; alternatively a new dental college may be established at Muzaffarpur under Bihar University.
6. Domestic or Home Science	A degree course in Domestic/Home Science may be introduced in Patna University and in one of the Agricultural Colleges under Rajendra Agricultural University.
7. Agricultural Engineering	An elective course in Agricultural Engineering may be introduced in the Institute of Technology, Muzaffarpur.
8. Ceramic and Refractory Engineering	A degree course in Ceramics and Refractory Engineering may be introduced in BIT, Sindri.
9. Coal Technology	A Post-Graduate Diploma course in coal technology may be introduced in BIT, Sindri.
10. Electronics and Telecommunication Engineering.	It may be introduced as an elective course at the degree level in all the Engineering Colleges of the State.
11. Forestry and Timber Technology	Forestry and Timber Technology may be included as one of the elective subjects for Bachelor of Science degree in Ranchi University and in Agricultural College, Ranchi, under the Rajendra Agricultural University
12. Food Processing and Food technology	It should be introduced as an elective course in the colleges of Agriculture under Rajendra Agricultural University.

Employment positions	Courses to be introduced or reorganised in the universities
1	2
13. Geophysics	... A Post-Graduate course in Geophysics may be introduced in Patna and Ranchi Universities.
14. Librarianship	... A Post-Graduate Degree as well as Diploma course in Library Science may be introduced in Patna University.
15. Languages	... A Post-Graduate Diploma course in (i) German and French languages, (ii) Russian language, (iii) Chinese and Japanese languages and (iv) Nepalee language may be introduced in (i) Patna University, (ii) Ranchi University, (iii) Nava Nalanda Maha Bihar and Bihar University and (iv) Mithila University respectively.
16. Journalists	... One-year Post-Degree and Diploma course in Journalism may be introduced in Patna University.
17. Industrial Management Course and Industrial Engineering.	Post-Graduate course in Industrial Management Course and Industrial Engineering may be introduced in B.I.T., Sindri.
18. Instrumentation and control	... A Post-Graduate Degree Course in Instrumentation and Control should be introduced in B.I.T., Sindri.
19. Microbiology	... A Post-Graduate course in Microbiology may be introduced in Patna University.
20. Leather Technology	... A degree course in Leather Technology may be introduced in M.I.T., Muzaffarpur.
21. Mining Engineering	... A degree course on sandwich basis in Mining Engineering may be introduced in B.I.T., Sindri.
22. Music and Fine Arts	... Degree course in Music and Fine Arts may be introduced in Patna and Ranchi Universities.
23. Nursing	... A degree course in Nursing may be introduced in Patna and Ranchi Medical colleges.

Employment positions	Courses to be introduced or reorganised in the universities
1	2
24 Pharmacists	... A degree course in Pharmacy may be introduced in one of the medical colleges of the State.
25. Personnel Management and Industrial Relations.	Arrangements should be made for the teaching of Personnel Management and Industrial Relations as a Post-Graduate subject in Ranchi University.
26 (a) Physicist (General) (b) Physics (Nuclear) and (c) Physicist (Radio and Electronics).	In the Post-Graduate courses in Physics, arrangements should be made for the teaching of all the three branches in the State.
27. Physiology	... Physiology may be introduced as one of the subjects for Bachelor's degree in Science and a Post-Degree course in Science in Patna and Ranchi Universities may be introduced.
28. Meteriology and Environmental Sciences.	Environmental Science with meteriology, geography, geology and Botany (Ecology) should be taught in some of the good constituent colleges in the universities of the State.
29. Physicians and Surgeons	... In view of the shortage of physicians and surgeons, there is need for trained medical personnel in the rural areas. A junior medical course for health and medical assistants with emphasis on practical aspects of health and medical care to meet the health and medical requirements of the rural areas should be introduced preferably as a diploma course in institutes to be attached with the hospitals.
30. Physical Education and Sports Instructors.	Physical Education and Sports Instructors' course may be included as one of the elective subjects for pass degree course in some of the important colleges in each of the Universities of the State.
31. Travel Agency and Tourists Guide	... A Post-Graduate Diploma course in Travel Agency and Tourist Guide course may be introduced in Patna and Magadh Universities.
32. Social Work	... The demand for trained social worker will increase. A Post-Graduate Course in social work may be introduced in Patna University.

Employment positions 1	Courses to be introduced or reorganised in the universities 2
33. Textile Technology	A degree course in Textile Technology may be introduced in Bihar College of Engineering and Bhagalpur College of Engineering (8.16—8.25).
34. Re-orientation of courses of Commerce	<p>Although the courses of studies of Commerce mainly deal with practical aspects and operational skills relating to Industrial and Business management, the method of teaching has tended to become theoretical and there is inadequate emphasis on practical aspects. The courses of studies now grouped under the heading "Commerce" may be designated as "Business Studies" in order to emphasise the practical aspects of studies.</p> <p>There is dearth of qualified Chartered Accountants and Cost and Works Accountants and there is increasing demand for them by industries and business undertakings in public and private sectors. There is also shortage of qualified Company Secretaries. In order to qualify for the positions of Chartered and Cost and Works Accountants and Company Secretaries candidates have to appear at the Intermediate and Final Examinations conducted by the respective professional institutes.</p> <p>Degree course in Commerce to be designated as "Business Studies" should be so re-oriented as to enable candidates with degrees in Commerce or Business subjects to pass the professional examinations held by these institutes. The committee recommends that the courses of Bachelor's degree in Commerce or Business Studies of the Universities of the State should include, apart from the subjects now included in the courses of studies, the following subjects for compulsory study :—</p> <ol style="list-style-type: none"> (1) Business methods and statistics; (2) Statistical and operational analysis; and (3) Advanced Accountancy including elements of Cost.

Employment positions

Courses to be introduced or reorganised
in the universities

1

2

The following subjects should, in addition to the subjects now included in the courses of studies, should be included in the courses of studies as elective subjects :—

- (1) Auditing;
- (2) System analysis and data processing;
- (3) Direct Tax Laws;
- (4) Management information and Control system;
- (5) Production and Inventory Control;
- (6) Principles of Law;
- (7) Factory Organisation and Engineering; and
- (8) Marketing (8.26—8.34).

35. *Introduction of Honours course in Applied Economics, Accounts and Finance.*— A special Honours course with 10 papers may be introduced under the direct supervision of Universities of Patna, Ranchi and Bihar. This should be a high level course which will prepare students to meet the requirements of business, economics, accounts and finance of public and private sectors. The syllabuses of courses should be such as to help the students who take up this course to qualify as Chartered Accountants, Cost and Works Accountants, Company Secretaries and Executives.

36. The teachers of these courses should possess professional qualification of Chartered Accountants, Cost and Works Accountants and post-graduate degree or/and diploma in Business administration with specialisation in accounts and finance. Teachers of Applied Economics should possess post-graduate degrees in Economics/ Applied Economics with experience of working as Applied Economics in industrial and commercial concerns (8.35—8.41).

37. The other areas in which industrial and business organisations require personnel are—

- (i) Personnel management and Industrial Relations;
- (ii) Business Economics;
- (iii) Marketing including Marketing in foreign countries;
- (iv) Production Control and Operation Management including Production and Inventory Control;
- (v) Maintenance and Replacement;
- (vi) Study in Industrial Engineering and methods of critical path analysis;
- (vii) Quantitative methods; and
- (viii) General Management (8.42).

38. *Personnel Management and Industrial Relations*.—Arrangements for teaching of Personnel Management and Industrial relations at the post-graduate level should be made in Ranchi University. It will be desirable that the teachers of courses in Labour and Social Welfare/Personnel Management/Industrial Management should possess not only good post-graduate degree in the relevant area but also experience of working in industries and business concerns. In a place like Ranchi, it may be possible to obtain part-time teachers with these qualifications.

Management Institutes at Ahmedabad, Bangalore, Calcutta and Xavier's Institute of Industrial Relations, Jamshedpur conduct post-graduate honours diploma courses in Management with specialisation in various branches referred to in paragraph 39. Xavier's Institute of Industrial Relations, Jamshedpur also conducts an honours diploma course in personnel management and industrial relations. The numbers of persons admitted to these courses from Bihar are comparatively small. There is justification for location of a management institute at Ranchi which is located in the centre of mining and industrial complexes in the State. The non-recurring and recurring cost of a management institute is heavy. The State Government may take up a proposal for location of management with the Government of India. In the meantime, a post-graduate 3-year in "Business Management Studies" with elective subjects for specialisation in :

- (i) Personnel Management and Industrial Relations,
- (ii) Marketing,
- (iii) Finance,
- (iv) Production Control and Operation Management including Production and Inventory Control,
- (v) Quantitative methods, and
- (vi) General Management

be introduced in Ranchi University. The courses should be conducted in an autonomous unit.

The method of teaching should include teachers, group discussions, seminars, discussions, presentation of papers, project assignment and case studies.

The Institute of Business Management and Economic Development already located at Muzaffarpur may, in view of its location, provide specialised courses in agricultural and water management (8.43—8.54).

39. Candidates for executive positions in various branches of management in public sectors and important private sectors undertakings which hold competitive examinations for recruitment are required to appear in (i) Essay, (ii) General Knowledge; and (iii) English; some are recruited on the basis of interviews conducted by the undertakings.

Candidates for recruitment to executive posts under the Central and the State Governments are required to appear at the written examinations in which they are examined in (i) Essay; (ii) General Hindi or General English; (iii) General knowledge or elementary general science and 3 subjects of their choice from groups : (a) relating to languages, literatures and humanities, (b) Social Sciences, (c) Public Administration, International Law and Constitutional Law, (d) Mathematics, Statistics, Science, etc. No candidate can, however, offer more than 2 subjects from one group. The standard of examination in each paper is that of Honours Degree course.

Persons who are recruited as teachers to teach students of post-graduate and undergraduate classes are required to possess good post-graduate degree and preferably Honours degree in relevant subjects.

Persons required to teach the students of secondary classes are required to possess degrees in relevant subjects together with a degree in teaching. Those who take up self-employment in industries and tertiary sectors after obtaining their degrees may find useful knowledge of 2 or 3 subjects together with skill relevant to the area of self-employment and good powers of oral and written expressions (8.55—8.68).

40. Keeping in view the requirements for recruitment to various positions under the Central/State Governments, in industries and business, teaching institutions and of self-employment the Committee recommends that the following three types of courses in Arts, Science or Commerce (Business studies) should be conducted in the undergraduate institutions :—

- (i) Special Honours course in one subject with 10 papers and one subsidiary subject of 3 papers,
- (ii) Honours course in two combined subjects with 10 papers with a subsidiary subject of 3 papers,
- (iii) Honours course in one subject with 6 papers and 2 subsidiary subjects of 3 papers each, and
- (iv) General pass course—3 subjects of 3 papers each.

In view of the importance of languages (English and Hindi) English with one paper of 100 marks and Hindi with one paper of 100 marks will compulsorily be taught in all the courses mentioned above.

The courses recommended are for 3 years degree course. An external examination should be conducted at the end of each academic term.

The special honours course will enable students to study in depth the honours subject and will be suitable for those who want to specialise in a particular discipline with a view to becoming a teacher or for research in that subject.

Honours course in the 2 combined subjects will be very useful for those who want to appear at the competitive examinations for recruitment to the executive positions under the Central and the State Governments. Honours in one subject will enable a student to study in moderate depth one subject and will be helpful to those who may either become teachers or appear at the competitive examinations.

General pass course will be suitable for those who want to become teacher in secondary schools or who want to compete for junior supervisory positions under the Central/State Governments or in Banks, industries, etc., or want self-employment (8.69—8.82).

41. The Committee recommends that, subject to inter-disciplinary approach in study of different subjects and the requirements regarding study of particular subject at the higher secondary courses for study of that subject in the undergraduate courses, it should be possible to promote greater flexibility in the combination of subjects.

The Committee recommended that arrangements should be made for teaching of Econometrics as an elective subject in the special general honours and combined degree courses in Economics and only those who have passed the higher secondary examination with Mathematics and offered mathematics as a subsidiary subject in the undergraduate course should be allowed to take up this elective subject (8.83—8.86).

42. In designing the courses of studies of various subjects for under degree courses, adequate emphasis should be placed not only on the conceptual knowledge but also on practical aspects and operational skills. There should, however, be adequate emphasis on the fundamental and conceptual knowledge in the honours courses and, particularly in the special honours courses.

Even in the courses of studies of humanities, there is need for adequate emphasis on the skill of oral and written expressions through debates, drama, dialogues and essay writing.

Practical aspects and operational skills are particularly important in the courses of studies for social sciences.

In designing the courses for science subjects, adequate emphasis should be placed on fundamentals, applied aspects, operational skills as well as on inter-disciplinary approach (8.87—8.91).

43. Those who plan the courses of studies should keep in view one of the important objectives of higher education, namely, "instructions in skills suitable to play a part in general division of labour" as recommended by Robbin's Committee on higher education. In order to adequately emphasise the practical aspects and the operational skills in study at the degree level, persons having academic background as well as experience of practical aspects and operational skills of different subjects/disciplines should be associated with the designing of the courses of study of those subjects.

It will be desirable to undertake radical revision of the courses of studies and weed out knowledge which has become obsolete and add knowledge which is essential.

Provision for adequate facilities in respect of teaching and hostel accommodations, laboratories, equipment, libraries, reading rooms, and play fields needs to be emphasised (8.92—8.97).

44. *Courses of Master's degrees in Arts, Science and Commerce.*—Courses of studies for Master's degree should be such as to enable the students to study the subject in depth. One of the 8 papers of study should be an essay paper. Post-graduate courses should be conducted only under the direct supervision of the universities.

As recommended by Education Commission (1964—66), in addition to the one subject course for Master's degree, combination courses consisting of say, one major subject and one or two subsidiary and related subjects should be provided. For this purpose, there should be provision for two or three elective papers or another related subject to be included in the study of the courses of the main subject. Examples of some combinations have been given in paragraph 8.101.

When courses of studies are drawn up hours/periods during which they are studied and completed should be indicated and the number of lectures/tutorials for each course should be fixed on the basis of hours indicated.

At the beginning of each academic session each teacher should draw up a plan for instruction indicating different areas of courses of studies and get it approved by Head of the Department. This plan should be strictly followed (8.98—7.103).

45. The universities and colleges should conduct short-term courses for those who are already working in Government, industries, business and other fields. Faculty for conducting such courses should be drawn from not only from the university and college teachers, but also from those with practical experience in the relevant areas (8.104).

46. *Research work and Research degrees.*—Research-cum-post-graduate courses for award of M. Lit., and M. Phil. should be introduced in universities of the State. Nobody should be allowed to undertake research for Ph. D., D. Sc., or D. Lit. degree unless he has successfully completed research-cum-post-graduate degree course of M. Lit. or M. Phil.

The State Government, and industrial and business undertakings should select topics on which they want research work to be done. The universities should select from them the topics on which their teachers or fellows should conduct research work. Adequate number of wholtime fellows with adequate amount of fellowship should be engaged and should conduct research work on topics agreed to between the universities and the Government, industrial and business undertakings. The Government and industrial and business undertakings should make adequate funds and facilities available for research work.

Research work should not be conducted by teachers at the cost of teaching of students. The teaching of students is the first responsibility of the teachers (8.105—8.108).

47. Job-oriented education has to be of good quality. The role of the teachers is the most important in ensuring good quality of education. Only those who have uniformly good academic records from secondary school examination up to the Master's degree should be appointed as teachers in the universities and the colleges. The university should regularly assess the performance of each department and teachers under it. Similarly, each college should assess the performance of teachers working under it and make the results of assessment available to the universities (8.105—8.113).

48. *Personality tests and importance of co-curricular activities.*—In view of the importance of personality test for recruitment to various positions under the Government, in industries and business undertakings, the importance of co-curricular activities in the universities and colleges needs to be emphasised. Adequate facilities for co-curricular activities must be provided in each university and college (8.114—8.116).

49. *Careers in the Army.*—Graduates with 'C' certificates in the N. C. C. can be recruited to the various positions of Army without being required to appear at the competitive examination. N. C. C. should be properly organised in the universities and the colleges.

The help of Army officers in N. C. C. should be taken in organising programmes for helping the students members of the N. C. C. to prepare themselves for *viva-voce* tests interviews before the Services Selection Board (8.117-8.118).

50. *Large-scale unemployment among degree holders.*—The recommendations made by the Committee, if implemented, can help the students of the State in competing for the jobs which are available under the Central and the State Governments, industries and business undertakings and take up self-employment to a greater extent than at present, but it cannot solve the problem of unemployment of very large numbers of degree holders. The Committee agrees with the recommendations of the Education Commission (1964—66) and in the “approach to the 5th plan” that the problem of higher education should be tackled not only from the demand side but also from the supply side and recommends that no new college of science and commerce or any other disciplines should be established except on the basis of genuine need and according to the plan jointly approved by the Government and the universities.

A Manpower Cell should be established under the Development Commissioner of the State Government and development of higher education should broadly conform to pattern of the requirements indicated by the Cell.

Planning of higher education should be done jointly by the State Government and the universities.

The machinery in the universities and the colleges for providing information to the students regarding job-opportunities is not adequate. If persons with practical experience in different areas are associated with designing of the courses of studies, and with teaching, it should be possible for students to know from them job-opportunities in different occupations. Booklets indicating job-opportunities in different areas and their requirements should be made available to the students in Libraries. Deans of student Welfare should also keep them.

From the point of view of job-oriented education it will be useful to associate the employers of the products of the universities in the Syndicates and the Senate of the universities. Apart from the representatives of the Government, representatives of the industry and commerce (including Public Sector undertakings) should be represented on the Syndicate, and the Senate of a University (8.119—8.132).

51. *Non-viable institutions.*—Large numbers of colleges are non-viable in the State. On the basis of survey, the colleges which are non-viable and cannot become viable within the next 2-3 years should be amalgamated with other colleges (8.133-8.134).

52. One of the reasons for craze for higher education is the disparity between the emoluments of various levels of workers, employees and professional people. There is need for revising wages and salaries at different levels on proper evaluation of jobs and for reducing disparity.

Many students enrol themselves in institutions for higher education, because they have nothing else to do. There are social reasons, for example, the amount of dowry is very often linked with the quantum of education types of degrees. There is need for social reform and strict implementation of laws regarding offer of dowry to prevent craze for higher education in those who are not capable of pursuing it seriously and profiting by it.

One of the effective methods of discouraging those who are not capable of receiving higher education and benefitting by it is to recruit to various posts only those who possess the minimum qualification and the specific vocational or commercial certificate

or diplomas required for those jobs. The recommendation of the committee in this respect made in paragraph 4.96 should be implemented on a priority basis.

It is also necessary to regulate admissions on selective basis keeping, of course, in view the needs of the equality of opportunities, by relaxation of the minimum standard of admission, if necessary, in the case of the candidates belonging to the Scheduled Castes and Scheduled Tribes (8.135—8.140).

53. *Economic development and development of Education.*—The level of educational and cultural development is very largely determined by economic development and social conditions.

Higher education of the traditional type in the State is not at all related to the pace of economic development and social progress. In the matter of higher education priority has to be given to the education and training of specialists, technologists, scientists, social scientists, administrators, teachers of quality, and persons with skill required for economic development and to education and training which will contribute to modernisation of society (8.141—8.143).

CHAPTER IX

ENGINEERING EDUCATION—DEGREE AND POST-DEGREE COURSES.

54. In view of some degree of unemployment among the engineers, particularly civil, mechanical and electrical engineers, the numbers of intake in the Engineering Colleges of the State in each of these branches have been reduced below the intake capacity of the Engineering Colleges (9.1).

55. Employers in the public and private sectors have mentioned before the Committee that, excepting in the very good among the graduates of the Engineering Colleges of the State, the following deficiencies have been noticed in them :—

- (i) They have no clear concepts of the fundamentals of the subjects they have studied.
- (ii) They have difficulties in expressing themselves properly in English and even in Hindi or mixture of Hindi and English.
- (iii) They show lack of general knowledge, and knowledge of their environments.
- (iv) The high marks awarded for sessional and practical work by the college and university authorities highly exaggerate the ability and performance of the students and go to show that perhaps the internal assessment of the students' work in the Engineering Colleges is not always fair and objective.
- (v) Most of the Engineering graduates, if appointed, show lack of confidence in dealing with their superior Managers/Supervisors, their peers and their subordinates.
- (vi) Most of them do not appear to have taken any interest in co-curricular/extra curricular activities which develop initiative, confidence and team work (9.2—9.8).

56. It is necessary that steps should be taken to remove the deficiencies and improve the quality of engineering education in the Engineering institutions of the State.

In order to improve the quality of teaching, the students of the Engineering Colleges should learn and be taught the knowledge of fundamentals and their application to practical problems. For this purpose, teachers of competence having not only knowledge of fundamentals but also of the practical aspects and operational skill should be appointed. Promotion of teachers to higher position should be made primarily on merit and not on seniority. Teachers should also be seconded to industries to gain practical experience.

Candidates who secure low marks in the test held for admission to the Engineering Colleges should not be admitted into them.

Visits to industries and observational tours which are very often used for sight-seeing should be more purposeful and more intensive.

Foundation for skill in language is laid in schools, but so long as the quality of teaching in schools does not improve, teaching of English should continue to be the part of the curricula for at least first two years of the Engineering Colleges. The students should be encouraged to speak and discuss in tutorials. They should be acquainted with their environments and encouraged to improve their general knowledge.

A committee appointed by the University should look into the marks obtained by students in theoretical papers and internal assessment of sessional and practical work. If it is found that the marks or grades awarded in internal assessment are proportionately much higher and not reliable, they should be scaled down on the basis of well-experienced norms of scaling down.

Social education including skill in communication should form part of Engineering education. Curriculum of social education should include study of man in relation to production processes, basic principles of economics of production, the need for increasing productivity, and commitment to the social and economic goals and ideals and skills in communication (9.9—9.15).

57. Practical training in works and factory should be made compulsory for all the Engineering graduates.

Practical training in workshop practice should be arranged in Engineering Colleges on the same lines as recommended in para. 4.80 of Chapter IV of the report.

The Engineering Colleges should continue to emphasise the importance of co-curricular activities.

Some selected Engineers working in the Public Works, Public Health Engineering and Irrigation Department and Bihar State Electricity Board should be deputed to teach in the Engineering Colleges and some selected teachers of the Engineering Colleges should be deputed to these Departments to gain practical experience.

It should be possible to arrange at least some of the courses of studies on sandwich basis as indicated in paragraph 9.19 (9.16—9.19).

58. Scope for introducing some new undergraduate and post-graduate courses in the Engineering Colleges of the State have been discussed in paragraph 9.20 of the report and paragraph 34 of the summary (9.20).

59. Research and Development Department of Bihar Institute of Technology, Mesra, Ranchi has been assisting Engineering graduates who want to set up small-scale industries by identifying areas of important substitution and technologies suited to small-scale industries. This Department has helped a number of Engineering graduate entrepreneurs who have been supplying the needs of mining and other industries. The Committee recommends that small committee consisting of the representatives of other Engineering Colleges and of the Research and Development Organisation, Mesra (Ranchi) may be set up for identifying the area in which Engineering graduates of other colleges may set up small-scale industries to meet the needs of agriculture and industries in the areas in which they are located (9.21—9.23).

60. The Committee recommends that mining in degree courses, mining in Engineering Polytechnics and Industrial Training Institutes for training personnel for mining industries, as already recommended by the Committee should be set up without delay.

The Committee also recommends that the Directorate of Technical Education of the State Government should get in touch with the authorities of Bharat Coking Coal Ltd. and College of Engineering and Technical Education and B. C. C. should draw up courses of studies for training programme for training and re-training personnel required by them (9.24—9.29).

CHAPTER X

EDUCATION FOR AGRICULTURE AND ANIMAL HUSBANDRY AT THE DEGREE AND POST-DEGREE LEVEL.

61. In view of the limited scope for employment of graduates and post-graduates in Agriculture and Animal Husbandry and Veterinary Science, the present intake in the colleges imparting education in Agriculture and Animal Husbandry and Veterinary Science is much below the actual intake capacity. In order to meet the needs of growing population and for generating surplus for development of economy, agriculture will have to be modernised. This will need people trained in agriculture. For this purpose, Polytechnic will have to be set up. Teachers with training in technology in agriculture and practical experience will be required for these Polytechnics. With the development of agriculture, there will be need for graduates in Animal Husbandry and Veterinary Science. Some graduates in agriculture who have their own lands may take up self-employment in farming when agriculture is modernised (10.1—10.4).

It is necessary that graduates in agriculture should have adequate practical experience. They should be required to undergo in Government farms, or if it is possible in selected farms of progressive farmers, practical training for at least one year before they are recruited as Extension workers or supervisors or as teachers in Polytechnics (10.5—10.7).

CHAPTER XI

MEDICAL EDUCATION.

62. Since the Committee on Medical Education, Bihar, 1973 has recently covered the ground relating to Medical Education at the degree or post-degree level, this Committee has not considered it necessary to cover the same ground. This Committee, however, feels that there is need for educating and training junior medical personnel who, even if they are not licensed to practise medicine and surgery, can work as effective health assistants to medical graduates to take proper health and medical care of the rural population. For this purpose, a three-year diploma course in medicine should be introduced with emphasis on practical aspects and skills but with a proper background of theory.

Apart from degree and post-degree courses in Biochemistry and Micro-Biology, there is need for introducing a degree course in Nursing and post-degree and degree course in Physiology, as recommended by the Committee.

Education relating to dentistry needs expansion (11.1—11.8).

CHAPTER XII

METHOD OF TEACHING AND EVALUATION.

63. While lectures will continue to be an important medium of education in the colleges and the universities, they must be adequately supplemented by tutorials. Seminars may also be used in post-graduate and the last year of honours classes of degree courses. Students should be asked to write essays or answers to questions to be discussed in tutorials. The teachers should offer their criticisms and suggestions for improvement. Students should participate in discussions in tutorials.

Teaching of science subjects must be supported by properly equipped laboratories and experiments.

In post-graduate classes and business management studies, "case studies" should be utilised because they acquaint the students with actual problems and have to tackle them in real situations. The community, administration, the university, guardians and students have all to play their part in creating suitable conditions in which steps can be taken to bring about improvement in teaching and the quality of education (12.1—12.13).

64. *Facilities and equipment for teaching.*—There must be adequate facilities and equipment for teaching including facilities for accommodation of teachers where they can sit and be available for consultation by students.

Library is the most important and useful facilities for education. It should not only contain good books and journals but should also have suitable reading rooms which should remain open for utilization by teachers and students not only during college hours but also in the morning and evening hours. Arrangements should be made for giving instructions to the students regarding how to use the library (12.14—12.17).

65. *Examinations, assessment and evaluation.*—Teaching methods and examinations and assessment are inter-connected in many ways. For many years there has been dislocation in the external examination system. Many have claimed the traditional examination system itself for this breakdown and dislocation. Suggestions have been made that the traditional examination system should be completely substituted by internal assessment.

In the 'Plan of Action' regarding examinations and assessment endorsed by the University Grants Commission, recommendations have been made that the university should prepare the syllabuses and "bank of questions" and colleges should be allowed to hold examinations under the supervision of their own staff and examination question should be selected from the 'Question Bank'. The marks system should be replaced by grade system.

In order that this plan may succeed, it is not only necessary that teachers of all the colleges should maintain integrity and objectivity but people and students must have full faith and confidence in them. In the present atmosphere, it is difficult to ensure this.

The external system of examination alone cannot be held responsible for dislocation of the system. There are many reasons including political and social environment and lack of integrity and trust. There is, however, need for reform in the system of external examination.

As mentioned by the Education Commission (1964—66), External Examination will have to be with us for quite a long time but it should be supplemented by Internal Assessment based on tutorial work and mid-term examinations. The grades obtained in the Internal Assessment should be shown in a separate column in certificate/diploma/degree. If, on the basis of the periodical review by the university, an institution is able to establish its reputation for fair and objective internal evaluation over a period, it may be authorised to conduct internal evaluation in respect of 30 per cent of marks allotted to a course of study, the remaining 70 per cent being kept for the External Examination. A candidate will be allotted separate grades for his achievements in the External Examination and internal evaluation.

In due course, the Institution, if it continues to maintain its liability, may be authorised by the university to conduct, under its own supervision, examinations and evaluations as suggested in the 'Plan of Action' endorsed by the University Grants Commission.

The Committee agrees with the recommendations in the "Plan of Action" for awarding grades to students instead of marks.

The recommendations in Plan of Action, on the basis of the suggestions made by the Committee in respect of examination may first be tried in the post-graduate courses by the University under their direct supervision. Later, this should be introduced on combined honours course.

Before, however, this is done, teachers of competence and integrity should be posted to the universities and institutions authorised to hold examinations and carry on assessment and evaluation under their own supervision (12.14—12.34).

66. In view of limited numbers of teachers of real competence, it is necessary to have an order of priority regarding their availability in different institutions. The post-graduate course, special and combined honours course and honours course in order of priority should have first claims on teachers of competence. In due course persons of competence taught by these teachers will be available as teachers to other colleges conducting other courses (12.18—12.36).

67. For raising the quality of education, other facilities including proper teaching and hostel accommodation, laboratories and equipment, libraries and play fields should be available to the teaching institutions (12.37).

68. The Committee recommends that, in order to give proper opportunities to the young people of the State for entry into All-India Institutions of reputations including engineering and medical institutions and for competing for All-India Services, Central Services and for various positions under the public and private sectors, all efforts should be made to complete the courses of studies and to hold the examinations, according to the prescribed schedules (12.38-12.39).

CHAPTER XIII

MISCELLANEOUS TOPICS : OPEN UNIVERSITY CORRESPONDENCE COURSE/SOCIAL SERVICE/REQUIREMENTS OF DEGREES, DIPLOMAS AND CERTIFICATES FOR EMPLOYMENT/TRAINING FOR SELF-EMPLOYMENT AND ENTREPRENEURSHIP.

69. Suitable conditions do not exist at present for establishing an open university in the State. Radio and Television Programmes are important technological means through which the open university functions. Feasibility of locating an open university may be examined if and when adequate technological support (facilities for education through radio, television, etc.) are available. In the meantime, provision for correspondence courses may be made in the universities of Patna, Ranchi and Bihar. Arrangements for part-time courses also be made in cities and towns where large number of employees working in Government offices, public and private sector, industrial and business undertakings and others want to pursue higher education.

Correspondence course should be properly organised by an institute under the university under a wholtime Director and with wholtime teachers. The teachers should prepare lessons which should bevetted by an expert committee. The written work by students should be corrected in time and returned to the students with the suggestions of the teachers.

Arrangements should be made for availability of text-books and reference books at important centres for use by those who are studying through correspondence course and part-time courses. If it becomes necessary, the institute of correspondence course of the university may open a Regional Office under a Deputy Director in a place where the numbers of students in the courses are large (13.1—13.13).

70. *Social Service*.—The requirement that a student of a college or university must participate in (i) National Service Scheme, or (ii) National Cadet Corps, or (iii) Sports and recreational activities should be fully implemented. Arrangements should be made for a larger number of students to participate in National Service Scheme with proper planning and co-ordination. For this purpose, a committee at the district level in which representative of the district level and other agencies responsible for social activities and those of the colleges should be formed. The Committee should draw up a list of schemes and projects in which members of N.S.S. should participate and the period for which they should participate. Adequate facilities for participation in N.C.C. or sports, games and recreational activities should be provided for those students who want to participate in them (13.14-13.15).

71. *Requirement of degree/diplomas and certificates for employment*.—The suggestion that there should be no minimum qualification requiring possession of a degree, diploma or certificate for employment under the Government is not feasible. Educational authorities cannot evade the responsibilities of assessing and evaluating in terms of degrees, diploma, certificates and grades the performance of those for whose education educational authorities are responsible (13.16—13.32).

72. *Training for self-employment and entrepreneurship*.—In view of the large sectors of self-employment in the State and lack of confidence and quality of entrepreneurship, programmes for training young people in entrepreneurship should

be implemented on a continuing basis. Such programme should be more practical and specific. The various Regional Development Authorities which have been set up by the State Government should conduct training programme in their areas for educated young people with reference to specific programme of development in their respective areas. The responsibilities of Development Authorities and different agencies of the State Government should not end with imparting of training; there should be follow up programme (13.23—13.29).

73. *Medium of instructions.*—Suitable text-books should be available in Hindi which is the medium of instructions in many of the colleges. Standard books on technical subjects which are still taught through the medium of English should be translated into Hindi. In the meantime, teaching of English should receive adequate emphasis at different stages as long as continues to be the medium of instructions in technical institutions.

Writing of note-books by University and college teachers should be altogether prohibited (13.30—13.34).

74. *Financial implications of the recommendations.*—In absence of adequate information and data from different departments, it is not possible to work out detailed financial implications of implementing the recommendations of the Committee. The recommendations, however, do not cost much and it should, by and large, be possible to find out funds from within the plan ceiling for implementation of necessary recommendations. It should be possible to find by adjustment or savings, some additional funds beyond the plan ceiling for important schemes relating to vocational and technical education and teachers training. The main emphasis on higher education should be on qualitative improvement and ban on mushroom growth of colleges which turn out only unemployable persons. Adequate provision, however, should be made for equality of opportunity of members of Scheduled Castes and Scheduled Tribes and other disadvantaged persons (13.35—13.39).

CHAPTER XIV

MACHINERY FOR IMPLEMENTATION.

Keeping in view the priority regarding implementation, the Committee recommends that—

- (i) The State Council for Vocational and Technical Education should be set up without delay.
- (ii) The Director of School Education should be made responsible for implementation of recommendations in respect of school education, and a small committee should be set up with Director as convener and the representatives of the Board of Secondary Education, Bihar Text-Book Corporation, Bihar School Examination Board and State Council of Educational Research and Training to meet periodically and review the progress.
- (iii) *Teacher education.*—There should be a Director of Training who should be an *ex-officio* Director of State Council of Educational Research and Training. He should be directly incharge for implementation of training programmes.
- (iv) A committee consisting of the Education Minister, as Chairman, Vice-Chancellors of the Universities and Education Commissioner should look after implementation of recommendations in respect of higher education. Wherever necessary, representatives of other concerned departments should be invited to participate in the meetings of the committee.
- (v) There should be a Cell in the Education Department consisting of Education Commissioner as convenor, Chairman of the Job Orientation Education Committee, Director, Higher Education, Secretary, Department of Technical Education/Director, Technical Education to initiate action for implementation of the recommendations of the committee through various departments and agencies
- (vi) The Chairman of the Job-Oriented Education Committee may be associated with State Council for Vocational Education, the committee higher and the Cell to be set up in Education Department for implementation of the recommendations of the committee.

CHAPTER XV

GENERAL OBSERVATIONS.

The Committee expressed the view in Chapter I of the report that education should be related to social and economic needs of and activities in the State. The Committee also expressed the view that education should contribute towards modernization of society and various productive processes. The Committee has made its recommendations keeping these aims and objectives in view.

Although education is necessary for progress and modernisation, it is not sufficient by itself to achieve them. Educational development must be supported by adequate economic development and right 'social climate'. It is necessary to create necessary material base for proper level and quality of education. Cheap educational degrees, diplomas and certificates acquired by some means or the other can lead the country nowhere and will be of no use for holders of such degrees, diplomas and certificates, if the economic and social activities of the State and the country cannot provide jobs to them, nor can holders of such cheap degrees, diplomas and certificates be expected to make useful contributions to the economic development and social progress. The Committee has accordingly laid very great stress on improvement of quality of education at all levels (15.01—15.09).

CHAPTER VI

POST-SECONDARY EDUCATION—ACADEMIC STREAM

6.1. Higher Secondary two-year academic course is a preparatory course for admission to undergraduate courses in Arts, Science and Commerce and professional courses in Engineering, Technology and Medicine. As already mentioned, Education Commission (1964—66) recommended that higher education should be broadly related to man-power requirements of the community. References have been made in the earlier chapters that the existing numbers of colleges and enrolments in them have no relationship with the economic and social activities of the State and the numbers of undergraduates, graduates and post-graduates in various disciplines and especially in arts, science and commerce far exceeded the man-power requirements. The problem of unemployment of persons who have received higher education has been engaging the attention of the country's planners also. In the document relating to the "approach to the Fifth Five-Year Plan" the following views were expressed regarding enrolments in secondary education and higher education :—

"Judged by the long-term perspective, the problem of the educated job-seekers cannot be solved by operating only on the demand side. Even in the case of the skilled categories, the intake of training institutions has had to be cut back to ease the problem. In the case of generalists, this has to be done much more drastically to reduce the problem to manageable proportions. University education must be so regulated as to conform increasingly to the likely quantum and pattern of employment opportunities for the educated youth. This will require not merely a restructuring of university education but also greater diversification and vocationalisation of secondary education to reduce the pressure for entry into institutions of higher learning. Furthermore, no regulatory measure can be justified which denied equality of educational opportunity. For promoting vertical mobility, education can be a very powerful instrument. The ineffectiveness of the present education system in this regard calls for important innovations and hard decisions."

6.2. The problem of unemployed university graduates undergraduates has been assuming serious proportions not only in Bihar but in other States of the country and, in fact, in most of the under-developed and developing countries. -

6.3. Even in the developed countries, the most important objective of education is to meet the requirements of various skills in the society. Report of the Robbin's Committee on Higher Education (Great Britain) mentioned that "instruction in skills suitable to play a part in the general division of labour should be the first aim of higher education", although it also listed "(a) promotion of the general powers of mind, (b) advancement of learning, and (c) transmission of a common culture and common standard of citizenship" as the other important objectives.

6.4. Messrs. Seth Spaulding and Joseph Herman of UNESCO writing in the World Year Book of Education (1972-73) on the topic "Universities facing the future" have referred to the role of the universities in the following terms :—

"Governments see the Universities as sizeable investment in the human resources of the future and in the knowledge that will serve national goals and aspirations.

Students see the University as a place where they spend valuable years of their early adult life, and they want these years to be productive and relevant to their life styles as they see them.

Parents see the University as the open door to social mobility of their children.

Employers look to Universities to provide young people who can do the jobs they want done.

The University is seen by the University Professor as sanctuary where he can pursue his academic interests in somewhat protected environments."

6.5. It will appear from these viewpoints that Government, students, parents, and employers all want higher education to be related to meaningful economic and social activities. The demand for job-oriented education is an expression of this feeling on the part of the students, their parents and employers.

6.6. We have already mentioned in Chapter I of the report that the numbers of job-seekers, who are secondary certificate holders, undergraduates and graduates are much larger than the jobs available. We have also considered in some detail various vocations for which there is demand in the State and the skills in which the young people should be educated and trained in the higher/post-secondary institutions as well as in institutions for school drop-outs who have not completed secondary education. Since no University Education is required for the skills in these vocations, we have recommended that only those young people who have completed the minimum academic qualification (which in many cases is a secondary school examination certificate) and possess specific skills required for these vocations should be recruited to these posts. This recommendation, if implemented, will further restrict the scope of employment of undergraduates and graduates in jobs for which they are overqualified but for which they do not possess the skills.

6.7. It is obvious that not only in the immediate future but, for many years to come the numbers of jobs available for those who receive higher education in Arts, Science and Commerce will be much fewer than the numbers of those who have received and will be receiving education in post-secondary and undergraduate courses in these branches even in the same numbers as at present. Since the numbers of employment positions available are much smaller than the numbers of degree and post-graduate degree-holders, only a few who have received education of good quality can expect to compete for these position. Job-oriented undergraduate and post-graduate education has, therefore, to be of good quality.

6.8. The following observations of the University Grants Commission in its report for the year 1972-73 are quite relevant in this respect :—

- "1. Growth rate of enrolment in University level courses has outstripped the growth rate in the national economy. This has resulted in the dilution of *per capita* investment in higher education and, therefore, in the dilution of standards in institutions in which facilities are stretched to the breaking point in order to accommodate increased enrolment. This has also created an ever-widening gap between the outturn of the universities and the absorbing capacity of the national economy. There is a disturbing and growing incidence of unemployment among the

educated, particularly women, and those who have passed out of the universities with degrees in science and professional courses.

2. Much of higher education, particularly at the undergraduate level, both in academic and professional courses, is not relevant to the needs, abilities and aptitudes of the students and to the needs of India's developing economy. Lack of congruence between the courses offered by professional faculties in the universities and the needs of the nation is highlighted by the non-availability of middle level professional personnel (e.g., doctors and engineers) needed in rural and backward areas.
3. The present system of higher education is generating much waste and stagnation. The failure rate at the first degree level is about 50 per cent; 70 per cent of students in arts and commerce and more than 40 per cent of students in science courses are placed in the third division in the post-graduate examinations. This raises serious doubts about the well-being of the university system in the country.
4. The pervasiveness of this huge wastage and stagnation is explained partly by the irrelevance of much of higher education to the needs and abilities of students and their environment and partly by the system of teaching, learning and examinations prevailing in the country.

6.9. About 86 per cent of students in colleges of the State study courses in Arts, Science and Commerce faculties. If massive unemployment has to be avoided and higher education has to be relevant to the economic and social needs of the State as well as those of the students, higher education including higher secondary or post-secondary academic stream of education has to be so planned and regulated as to conform increasingly to the likely quantum and pattern of employment positions for them.

6.10. We have already referred to the fact that sometimes demand is made for education for its own sake in the fond hope that education including higher education will somehow or other result in raising the social, cultural and other values in the society. Underlying this hope is also the optimism (which is, however, not based on any appreciation of realities) that educated persons will somehow find out some work and some places in the society. There is no basis whatsoever for such hope and optimism. On the other hand, the numbers of educated unemployed persons have been rising and their frustrations have been increasing. These have led to social tensions. It needs to be repeated that in a developing country like ours and, especially in a comparatively backward State like ours increase in investment in higher education irrespective of its contributions to economic and social activities results in corresponding lower investment in the economic and social activities which create jobs for educated persons.

6.11. Unplanned and unrestricted growth of higher education has also resulted in deterioration in the quality of education. Complaints have sometimes been made that the products of the colleges and the universities are unemployable even in situations in which no specific skill except proficiency in language and general knowledge is required. As mentioned by the University Grants Commission in its report for the year 1972-73 that the pressure of numbers has also deleterious effect on good teaching. Sufficient funds are not available to ensure even the bare minimum physical and

other facilities including good teaching staff for a minimum level of educational standards in a large number of the existing colleges and the universities in the State. In the circumstances, there cannot be meaningful and proper planning of higher education including higher secondary academic stream unless effective steps are taken to prevent unplanned and unrestricted growth of post-secondary institutions and colleges.

6.12. Even in respect of the Secondary Schools, we have recommended that unrestricted and unplanned growth of secondary institutions should be prohibited and no secondary institutions should be allowed to be set up, unless it is on the basis of a plan approved by the Government and in response to the economic and social needs of the community in which it is located and unless it has the minimum facilities.

6.13. Those who study Arts and Commerce and, to a large extent, Science, do so mainly for the white collar jobs. White collar jobs are available, largely, under the Government in this country and next to it under industrial and commercial concerns. Growth of such jobs under the Government, industries and commercial concerns are dependent on economic growth. The growth of primary and secondary sectors in the State has lagged behind and is likely to continue to lag, for many years to come, far behind the numbers of those who are already enrolled and will continue to be enrolled for higher education. In the circumstances, the first step to be taken for purposeful planning of higher education is to prevent the opening of new colleges of Arts, Science and Commerce, except on the basis of genuine and felt need. This will mean taking hard decisions, but if education is to be related to the economic and social activities and massive unemployment and consequent social unrest and tension have to be avoided, there is no alternative to this hard decision.

6.14. Even from the point of view of "promotion of powers of mind, advancement of learning and transmission of common culture and common standard of citizenship", the three objectives, in addition to the most important objective of "instruction in skills suitable to play a part in the general division of labour" mentioned in Robbins's Report on Higher Education, there is need for preventing growth of sub-standard institution of higher education because for want of sufficient funds, it is not possible to provide the minimum facilities to ensure quality education in them and without even minimum facilities such institutions cannot impart education which will meet the requirements of these objectives.

6.15. The Committee, therefore, strongly recommends that the State Government should, by legislation, prohibit the establishment of any new colleges except on the basis of a plan approved by the State Government to meet the economic and social needs. The criteria of social needs should include the needs of the backward areas and those of equality of opportunity.

6.16. There are, at present, 275 colleges in the State conducting courses in Arts, Science and Commerce. All these colleges conduct at present two-year Intermediate courses in Arts, Science and Commerce. As already mentioned, the numbers

of those who join the courses in colleges in Arts, Science and Commerce are far in excess of those for whom jobs are available or are likely to be available for some years on the basis of the economic and social activities of the State. In no case, however, the numbers of students to be enrolled in higher secondary academic course in Arts, Science and Commerce should exceed the numbers of those who are at present enrolled in the Intermediate classes of the colleges. Only about 25 per cent and 27 per cent of the candidates appearing at the Secondary School Examination were successful in 1973 and 1974 respectively, and only about 55,000 students successfully completed the Secondary School Examinations held in these two years. Even if about 50 per cent of them successfully complete the examination, about 1,00,000 students will obtain School Examination Certificates. The annual growth will be of the order of about 5-6 per cent. About 50 per cent of these seek, at present, admissions in the Intermediate classes of the colleges. If the recommendations of the Committee in respect of vocational education is implemented, an appreciable number of students completing secondary education will join the post-secondary vocational institutions. It may be assumed that, for the present, about 40 per cent of them may join the vocational courses. Provision may have, therefore to be made for admission of about 30,000 students to higher secondary academic courses. If the number of admissions in each class or section of higher secondary class is limited to about 60 there will be need for about 500 units in which higher secondary courses may be conducted. There will be about 100 institutions—most of them in the large urban areas in which 2 or 3 units of classes can be conducted. It may, therefore, be safe to assume that on the basis of the existing rate of admissions in the intermediate classes in Arts, Science and Commerce, higher secondary academic courses may have to be conducted in 400 institutions that is in about 1/7th of the secondary schools.

The Committee recommends that higher secondary academic courses may be conducted in about 1/7th of the secondary schools

6.17. *Location of the courses.*—Since the two-year higher secondary/post-secondary courses are undoubtedly part of the secondary education, these courses should be located in the selected secondary schools which have at present adequate facilities in respect of accommodation (teaching accommodation and hostel accommodation), play-field, library, laboratories, equipment and staff and which have adequate land for further expansion and each of which has not less than 400 students on its roll in classes VIII to X.

6.18. It has been contended that, if as a consequence of addition of higher secondary classes to the selected secondary schools, the existing intermediate classes are abolished from the colleges, many of the existing colleges will become financially non-viable. There is, therefore, a view that higher secondary/post-secondary classes (XI and XII) should continue to be located in such colleges for an adequate period to enable them to become viable without the two classes being attached to them. If this suggestion is accepted and the higher secondary/post-secondary classes (XI and XII) continue to be attached to such colleges they will pose many difficulties. There is a common cadre of teachers in the colleges and there is no distinction between teachers teaching in the intermediate classes and those teaching in the degree classes. With the replacement of intermediate classes by the higher secondary classes there will be difficulty in allocating teachers for the higher secondary courses. If they continue to be a constituent part of the college. It will, therefore, be advisable to separate the two intermediate classes from such colleges and constitute them into a separate unit with two or four secondary classes added to them.

6.19. In selecting the secondary schools in which higher secondary classes will be located or the colleges the intermediate classes of which, together with the secondary classes, will be constituted as a separate unit, due considerations must be given to the requirements of different areas so that there is an equitable and fair distribution of higher secondary schools throughout the State. The population of an area, together with its density and the student population of the secondary schools of that area should be taken into consideration in selecting the areas for location of the higher secondary schools. In the areas of Chotanagpur and Santhal Parganas and some other areas in which the density of population is low, the population and the student population to be covered should be less than that in the areas in which the density of population is high.

6.20. The most central place which is convenient from the point of view of communication should be the actual location of the higher secondary schools in an area, provided that there is already a secondary school which satisfies the criteria for upgradation to the higher secondary stage.

6.21. These objectives can be achieved only if there is proper planning in location of higher secondary schools. This planning can be done by the State Education Department and the Board of Secondary/Higher Secondary Education which will look after the secondary education/higher secondary education. In view of the large expenditure involved in establishment and maintenance of secondary and higher secondary schools, initiative for the location of secondary schools/higher secondary schools should rest with the Government and the Board of Secondary/Higher Secondary Education. In fact, Board of Secondary/Higher Secondary Board of Education should prepare, taking into consideration, among others, man-power requirements, a five-year plan for secondary and higher secondary education. After the Government will have approved the plan, it should be incorporated in the State Education Five-Year Plan. On the basis of this plan, provision for expenditure should be made in the annual plan and the annual budget.

6.22. These steps are necessary in order to prevent mushroom growth of sub-standard schools. It has already been mentioned that unplanned expansion of colleges has resulted in deterioration in the quality of education and outturn of large numbers of educated persons who are unemployable. The mistake committed in allowing unplanned expansion of schools and colleges should not be repeated, otherwise there will be no improvement in the quality of education and the problem of educated unemployment will become more acute.

6.23. A student remains engaged for about 5 to 5½ hours in secondary classes in his school. When he enters a college for study of courses in Arts and Commerce, he remains engaged in the college for hardly 3 hours a day, although a student taking up courses in Science remains engaged for 5 to 6 hours a day. The hours during which the students taking up Arts and Commerce remain free from the college work are either utilised by many of them on the streets, in restaurants or cinemas or idle-gossips. Very few students utilise these free hours for independent study in the libraries or at home. Such students develop the habit of not putting in full day's work and find difficulty in adjusting themselves to hard work, if they are fortunate enough in getting employment. Students who are fortunate in getting jobs after completing their college education have to spend about 6 hours in office in which they have to work and for about 8 hours in factories/mines in case they get jobs in factories/mines.

6.24. It is desirable that students in the higher secondary courses in Arts and Commerce which will replace the corresponding Intermediate classes should be kept

engaged for at least $4\frac{1}{2}$ hours a day. It is not necessary that they should be kept engaged through lectures in classes. The lectures should be supplemented by tutorials, presentation of papers, guided study in the libraries and co-curricular activities. For this purpose, as already suggested, each class or section of a class should consist of not more than 60 students. It may be necessary to increase the number of teachers for the higher secondary courses in Arts and Commerce in comparison with the numbers engaged in these branches in Intermediate classes. The pay-scales of the teachers in the higher secondary classes will be lower than those of the Intermediate classes of the colleges. It may not, therefore, be necessary to incur any substantial additional expenditure to implement these recommendations. Even if the implementation of this scheme costs a little more, it will be worthwhile implementing these suggestions in view of their contributions in promoting the habit of hard and sustained work among the students. The Committee recommends that the students should be at least taught for 24 hours a week; each period should be of one hour's duration. This will include not only lectures but tutorials and guided study also. In addition, the effective working days in a year should not be less than 230 days.

6.25. *Teachers.*—Teachers of higher secondary classes should possess second class degree in the relevant subjects. Preference should be given to those who have passed with honours in relevant subjects in their degree course. The teachers should draw pay in the Upper Division of the Bihar Educational Service. Teachers of the existing secondary institutions who possess the qualifications mentioned above should be considered for the posts of teachers in the higher secondary classes.

6.26. *Principal.*—The Principal of an institution which is upgraded into a higher secondary/post-secondary institution should get pay in the pay-scale of B.E.S., Class II plus a special pay of Rs. 150 a month—the same scale of pay and special pay as recommended for the principal of an elementary teacher training college. He will be in overall charge of the institution including those of the secondary classes and will be assisted by an Assistant Principal who will be in Class II of the B.E.S. without any special pay. The Principal should have the minimum experience of 15 years as a teacher in a secondary school with not less than 300 students and must have administrative capacity.

6.27. As already mentioned, collegiate education consists of two-year intermediate courses in Arts, Science and Commerce followed by two-year degree courses in these disciplines or three, four or five-year degree courses in agriculture, veterinary, engineering and medicine respectively. The general pattern of the scheme of studies of the intermediate course includes study of two or three languages including Hindi, mother-tongue for those whose mother-tongue is not Hindi and English. In addition, a student has to study and is examined in three subjects from the groups of languages, humanities and social sciences for intermediate certificate in Arts, or three Science subjects for intermediate certificate in science and three commerce subjects for intermediate certificate in commerce.

6.28. The aim of three-year degree course of the national pattern of education of 10+2+3 is to raise the standard of education at the degree level so as to enable a student to study in some depth the subjects he chooses with a view to specialising in the discipline(s) of his choice. The aim of the two-year higher secondary/post-secondary course, as a preparatory to degree course, is to enable him to study in depth some of the subjects which he studied at the secondary level or some new subjects so that he may prepare himself for the degree course. At the stage of higher

secondary course the aim should not be to enable a student to specialise in any particular subject. Since general academic education will end with the higher/post-secondary course, no attempts should be made at specialisation at this stage. As mentioned by the Education Commission (1964—66), while study of the main languages should continue at this stage, students should have a wide choice of subjects from groups of languages, humanities and sciences, social sciences and art and craft work.

6.29. Since adequate knowledge of the language which is the medium of instruction (Hindi for most students in Bihar) and of English which is not only the associate official language of the Union Government and the library language, but also the medium of most of the examinations conducted by the Union Public Service Commission, and of the important Public and Private Sector business and industrial undertakings and the medium of instructions in Engineering and professional colleges both these languages should be compulsorily studied. In addition, a student will have to compulsorily study 4 subjects (with the provision of a fifth subject who want to study an additional subject) from a number of subjects.

6.30. We accordingly recommend that the scheme of study and examination for the higher secondary academic stream should be as follows :—

A. Compulsory subjects for study :—

- | | | |
|-------------|-----------|------------|
| (1) Hindi I | One paper | 100 marks. |
| (2) English | One paper | 100 marks. |

B. Any of the four following subjects of two papers each with 100 marks :—

(3) Any one of the following languages with emphasis on literature :—

Hindi, Bengali, Urdu, Maithili, Assamese, Kannada, Kashmiri, Malayalam, Marathi, Oriya, Punjabi, Tamil, Telgu, Sanskrit, Pali, Persian, Arabic, English, Russian, French, German, Chinese, Japanese and Nepalee.

- (4) Mathematics.
- (5) Statistics.
- (6) Physics.
- (7) Chemistry.
- (8) Biology.
- (9) Human Biology.
- (10) Geology.
- (11) Geometrical drawing.
- (12) Economics.
- (13) Sociology.
- (14) Psychology.
- (15) Civics.
- (16) History.
- (17) Geography.
- (18) Logic.
- (19) Commerce (Business Organisation and Administration).
- (20) Book-keeping and Accountancy.
- (21) Physical Education.
- (22) Home Science.

- (23) Paintings and Sculpture.
- (24) Music.
- (25) Military Science.
- (26) Physical Education.

NOTE 1.—A student may be allowed to study one Indian language and literature and a classical subject or a foreign language and two of the remaining subjects included in serials 4 to 26 in the preceding paragraph.

NOTE 2.—A student may study an additional subject in addition to the four out of the optional subjects he is required to study. Marks over and above the minimum marks required for a pass in the subject will be added to the total of aggregate marks and the division of the candidate who is examined in the additional fifth subject will be determined on the basis of aggregate marks inclusive of the marks of the additional fifth subject over and above the minimum pass marks. In case of award of grades, a separate grade will be awarded for the fifth subject.

NOTE 3.—A student may take up either Biology or Human Biology but not both.

NOTE 4.—Although a student is free to select any four or, if he studies a fifth subject, five subjects for study, requirements of admission to university courses in Arts, Science and Commerce, degree courses in engineering and technology and degree courses in medicine and surgery will have to be taken with consideration in providing combinations of subjects to be taught in the higher secondary/post-secondary classes (XI and XII). For example, those who want to study engineering will have to study Physics, Chemistry and Mathematics and those who want to study medicine will have to study Physics, Chemistry and Biology or Human Biology out of the four or five subjects to be chosen for study. Similarly, those who want to study Commerce will have to study Commerce, Book-keeping and Accountancy and Economics or Mathematics or Statistics at the higher secondary/post-secondary stage. Those who want to study honours courses in Economics in the degree course will have to study Mathematics or Statistics at the higher secondary stage. Those who want to study Mathematics, and Science subjects in the degree courses will have to study these subjects at the higher secondary stage.

NOTE 5.—Even in respect of other subjects preference should be given in admission to honours degree courses in any discipline to those who have studied that discipline at the higher secondary/post-secondary stage.

6.31. *Admission to higher secondary/post-secondary academic courses.*—In order to maintain the level of standard of higher secondary/post-secondary academic courses, it is desirable to restrict admission of the students whose performance is not below the average grade or who have received at least 45 per cent in the aggregate in the secondary examination. If the candidates belonging to the Scheduled Castes and Scheduled Tribes fail to get admission on this basis to the extent of places reserved for them, the standard of admission may be relaxed and the candidates of these classes who are near average or have secured up to 40 per cent marks may be admitted to make up the shortfall. We are suggesting in the chapter relating to examinations and evaluations that, if a candidate who has obtained third division or second division or a lower grade like B, C or D at the secondary examination, wants to improve his division or grade he may be allowed one chance to do so. This facility will enable a student who secures less than 45 per cent marks or a grade lower than the average grade to improve his performance and will not affect adversely the prospects of

a candidate who secures a lower division or grade on grounds of illness or bad luck. If he fails to improve his division or grade even in the second chance, it may be safe to presume that he is not fit for admission to the higher secondary/post-secondary academic course. In any case, there will be no bar to his admission to vocational courses, and, if he wishes to study further after completing vocational courses and taking up some vocations, it should be possible for him to study for the academic stream and degree courses through correspondence courses or by attending evening classes.

6.32. There should be a public examination at the end of the two-year higher secondary/post-secondary courses. The details of the examinations and evaluations to be conducted at the higher secondary/post-secondary courses will be discussed in the chapter dealing with examination and evaluation.

6.33. The contents of the courses of the higher secondary classes (Classes XI and XII) should be such as to enable the students to acquire breadth of knowledge and skill in various disciplines which they may choose to study and prepare them for studying the courses of the upgraded three-year degree courses. References have already been made in the earlier chapters to the fact that very large numbers of undergraduates and graduates are unemployed mainly because, in the economic and social activities in the State, there are not adequate numbers of jobs to absorb them and partly, because most of them do not possess skills required for comparatively small numbers of available jobs. In the chapter relating to Vocational Education (Chapter IV) and Teacher Education (Chapter V) recommendations have already been made for education and training in skills required for various occupations which are available or likely to be available in the State and for which school leavers, after training in the required skills, are found suitable.

6.34. As already mentioned, the contents of the courses of higher secondary academic stream should aim at developing skills and breadth of knowledge which will enable the students to study in depth disciplines he chooses in the degree courses in arts, science, commerce, engineering, medicine, etc. The standard of contents of various subjects to be studied at the higher secondary stage should not be lower than that of the present intermediate classes conducted by the colleges. The details of the courses will have to be prepared by the Secondary Board/the Higher Secondary Board of Education, in consultation with the State Council of Educational Research and Training and Bihar Secondary School Examination Board. The contents of the courses should not only be such as to enable the students to study in breadth and in some depth the subjects which he chooses to study and promote their power of mind and advancement of learning but should also be relevant to the economic and social activities of the State and the country and promote achievement of national goals of justice—political, economic and social, national integration, secularism, rapid economic development, modernisation and equality of opportunity. Perusal of the existing courses of study of the intermediate classes of the universities in the State indicates that the courses are prepared in the traditional manner. While the contents of courses must reflect the social, economic and cultural environments of the State in which the educational institutions have to function, they should favourably compare with the standards achieved in the developed countries.

6.35. While, as an interim measure, the courses of studies drawn up by the Patna University for intermediate classes may be adopted, revision of courses should be taken up at the earliest opportunity. Management of higher secondary education will have

to be entrusted to a reorganised State Board of School Education which should deal with both the secondary and higher secondary education. It will be one of the main functions of this body to draw up syllabuses and courses of studies with the help of the State Council of Educational Research and Training and experts on the subject. As already suggested in Chapter V relating to Teacher Education, the State Council of Educational Research and Training will have to be reorganised and expanded to fulfil the task to be assigned to it.

6.36. *Suitable job-opportunities for Higher Secondary School Examination certificate-holders—Recruitment to the Armed Forces.*—Recruitment is made every year for admission to National Defence Academy, Indian Military Academy and Indian Navy on the basis of competitive examinations held by the Union Public Service Commission. The Union Public Service Commission recommended the following numbers of candidates for admission to National Defence Academy in examinations held in 1969, 1970 and 1971 :—

1969	May	...	...	325
	December	...	...	379
1970	May	...	...	331
	December	...	...	247
1971	May	...	...	192
	December	...	...	298

The minimum qualification for admission to the National Defence Academy Examinations is a Higher Secondary Examination certificate or Pre-University Examination certificate or Indian School Certificate Examination or 1st year examination certificate of the two-year intermediate course. With the introduction of 2-year higher secondary course, a candidate who will have passed the 1st year examination of the 2-year higher secondary course will be admitted to this examination.

6.37. The numbers of persons recommended by the Union Public Service Commission for admission to the Military Academy on the basis of examinations held in 1969, 1970 and 1971 are given below :—

1969	May	...	...	84
	November	...	...	81
1970	May	...	...	76
	November	...	...	81
1971	April	...	...	84
	November	...	...	74

9, 24 and 20 candidates were recommended by the Union Public Service Commission for admission to the Indian Navy in 1969, 1970 and 1971 respectively.

The minimum qualification required for admission to the Indian Military Academy examination and Indian Navy examination is a pass in the Intermediate examination or the 1st year examination of the 3-year degree course.

6.38. In all these three examinations written examinations are held in the following subjects :—

- (1) English,
- (2) General Knowledge I,
- (3) General Knowledge II,
- (4) Mathematics I, and
- (5) Mathematics II.

General Knowledge I comprises physics, chemistry and general science and General Knowledge II comprises social studies, geography and current events.

Mathematics I comprises Arithmetic and Algebra and Mathematics II comprises geometry, mensuration, plane co-ordinate geometry and trigonometry.

6.39. The Union Public Service Commission holds an examination for recruitment to the Special Class Railway Apprentices who, after recruitment, receive apprenticeship training for appointment as officers in the technical branch of the Railways. The minimum qualification for admission to this examination is first or second division in intermediate or equivalent examination. The subjects in which the candidates are examined are as follows :—

- (1) English.
- (2) Science and General Knowledge.
- (3) Mathematics I.
- (4) Mathematics II.

6.40. It will appear that, for admission to the National Defence Academy examination, Indian Military Academy examination Indian Navy examination and Sepecial Class Railway Apprentices, a candidate has to study English and Mathematics. He has also to acquire knowledge about science subjects and social sciences for answering questions on General Knowledge. Candidates studying in higher secondary course who want to appear at these examinations may be advised to study these subjects in their higher secondary courses. References have already been made in the chapter relating to school education (Chapter III) to the need for compulsory study of languages including Hindi and English, Mathematics, Science and Social Sciences (History, Geography and Citizenship) in the secondary course. If this recommendation of the Committee is accepted and implemented, students completing secondary school examination will have knowledge of these subjects in which the candidates are examined for recruitment to these services. If they further study these subjects at the higher secondary stage it should be possible for them to do well in the competitive examinations held by the Union Public Service Commission for admission to these services. The combination of the following subjects at the higher secondary stage will be useful to such candidates :—

- (1) English.
- (2) Mathematics.
- (3) History or Geography.

- (4) Physics or Chemistry and one additional Subject from among the subjects referred to in (3) and (4) which is not studied as one of the

four optional subjects. It should be possible to permit these subjects in a number of higher secondary institutions. Students who have aptitude for careers in the Defence Forces and desire to join may be advised to take up these subjects. They may also be advised to join the National Cadet Corps.

6.41. A student whose performance is high in the National Cadet Corps has greater chance of succeeding in competition for entry into the commissioned rank of the Armed Forces. National Cadet Corps is a youth movement which promotes the quality of leadership, discipline, capacity to organise, self-reliance and devotion to duty—qualities which are required for success in the Armed Forces. A student who obtains 'C' certificate in National Cadet Corps is exempted from appearing at the written examination held by the Union Public Service Commission for entry into the National Defence Academy, Indian Military Academy and Indian Navy. The following statistics will indicate that the National Cadet Corps have an advantage over others in admission to the various officers training establishments of the Armed Forces :—

Year.	Type of entry into services.	Total no qualified.	No with N. C. C. background.	Percentage.
July, 1973 to July, 1974	NDA	987	664	67.3
Ditto	IMA Direct Entry.	290	160	55.2
Ditto	IMA Graduate Course.	357	302	84.6
Ditto	OTS	790	571	72.3
1972-73	Navy	769	590	77.7
Ditto	Air Force	1,139	873	76.6

6.42. It is, therefore, desirable that those who want entry into the Armed Forces should be active members of National Cadet Corps. Students who have done well in the National Cadet Corps have better chance of success in the competition, other things being equal, than others for entry into the services under the Police Department and security organisations in private and public sector undertakings.

6.43 It is, therefore, desirable that the National Cadet Corps should be strengthened in the universities and colleges of the State and senior wing of the N.C.C. should be introduced in the higher secondary schools when they are organised. Unfortunately the disturbances in the University and College campuses leading to frequent closures of the institutions in the academic session during the last so many years had their impact not only on the standard of education, but also on co-curricular activities including those relating to National Cadet Corps. There were difficulties in holding regular camps in which students receive intensive training and which enable them to obtain 'B' and 'C' certificates. Parades are not regularly held in the University and College campuses. In view of the usefulness of training in National Cadet Corps from the angle of employment as well as for character building, there is need for making the organisation more effective.

6.44. National Cadet Corps Organisation is a joint venture between the Defence Ministry of the Government of India and the State Government and Universities and colleges. Defence Ministry of the Government of India makes available the services of defence personnel for manning the organisation and training the students. The Government of India and the State Government jointly provide funds for running the camps and for other activities. Unless, however, the Universities and the colleges take active interest, the programmes of National Cadet Corps cannot be successfully implemented. Few heads of institutions take active interest in the activities relating to National Cadet Corps. It should be one of the important functions of the heads of institutions to promote the activities of the National Cadet Corps and other extra-curricular activities. The efficiency of a college or University should be judged not only on the basis of co-curricular activities including performance of National Cadet Corps Wing of the students of the institutions concerned.

6.45. In order to prepare students for careers in the Armed Forces, Sainik Schools have been set up in different States. These Sainik Schools are set up and managed jointly by the Central and State Governments. They conduct secondary and higher secondary courses of the Central Board of Education. In the curricula of these schools adequate emphasis is placed on games, sports and other co-curricular activities which develop qualities of leadership, discipline, capacity to organise, self-reliance and devotion to duty. One Sainik School has been located at Tilaya in Hazaribagh district in the State. The number of boys qualifying for admission in Sainik School in the State is much larger than the intake capacity of Tilaya Sainik School. A few of the boys who qualify are admitted in Sainik School in two or three neighbouring States in which vacancies are available, but a large number of boys who qualify for admission are not able to get admission. There is justification for at least a second Sainik School in the State. Sainik School is wholly residential and most of the students whose parents' income is below a stipulated sum get scholarships to meet the entire cost on account of tuition, lodging and boarding. The cost of establishment of a Sainik School and maintaining it is quite heavy and in view of the need and urgency for improvement of the common schools, there will be difficulty in giving priority to establishment of a second Sainik School in the State. In view of the fact, however, that the education and training in the Sainik School is oriented towards training boys for entry in the commissioned ranks of Armed Forces and a large percentage of the students are assured of jobs in armed forces, establishment of a second Sainik School in the State may be considered, if and when funds are available. In the meantime, it will be desirable to introduce co-curricular activities on the lines of those introduced in Sainik Schools in some of the selected schools which have already facilities for such co-curricular activities in the State. At least one or two schools in each Division may be selected for this purpose. Assistance of Army Officers working in N.C.C. Offices for developing and conducting co-curricular activities in these Sainik Schools may be taken.

6.46. There are many intermediate categories of posts like Junior Supervisory posts under the State Government for which degree is the minimum qualification. Persons recruited to some of these posts are given intensive institutional training as also training on the job. If the standard of secondary and higher secondary course is raised on the lines suggested by the Committee it should be possible to recruit to these intermediate categories of posts higher secondary examination certificate holders and give them intensive training for jobs which they have to perform. We feel that in many of these jobs it will be better to recruit higher secondary certificate holders on the basis of competitive examinations and to train them for the specific jobs they have to perform. The training programmes should be tailored to the

requirements of the job and should include not only the subjects relevant to their jobs but also such subjects and language, and civics and current affairs. The Committee recommends that the State Government may review the minimum qualifications for the posts of intermediate categories of Junior Supervisory posts in the light of these recommendations.

6.47. Bihar Public Service Commission holds competitive examinations for a number of posts for admission to which the minimum qualification is a pass in the higher secondary (secondary examination plus one year study or intermediate examinations). These posts are—

- (i) Sub-Inspector of Police (the State Government have recently decided to withdraw this from the purview of the Bihar Public Service Commission. Even if the I.-G. of Police makes recruitment to these posts, the minimum qualification will be a higher secondary school certificate or intermediate examination certificate);
- (ii) Supervisor, Co-operative Societies;
- (iii) Statistical Calculator;
- (iv) Assistant Jailor; and
- (v) Sub-Inspector of Excise.

A candidate for the post of Sub-Inspector of Police is examined in the following papers :—

COMPULSORY PAPER.	MARKS.
(1) General Hindi	100
(2) General Knowledge (with general Science).	100

One out of the following :—

(1) Elementary Mathematics	100
(2) Science (Physics, Chemistry and Biology).	100
(3) Indian History (from 1526 to the present time).	100
(4) Geography	100
(5) Economics	100

6.48. *Proficiency in games and sports.*—We have recommended that the Physical education or games should be one of the compulsory activities at all stages of school education. Physical education, games and sports are not only necessary for the health and proper physical development of the students but also for development of other qualities like leadership, team spirit, selflessness, etc. Those who are very proficient in games and sports are likely to find employment not only as physical instructors in schools and colleges but also in industrial and business concerns. Persons who are very proficient in games and sports and who participate in national and international competitions win laurels not only for themselves but also for their

country and the organisation in which they are employed. Countries which do well in international games and sports organise their own sports and games in such a manner that they pick up talents from early age and get them trained under proper coaches. In our State also it may be necessary to pick up promising boys and girls at an early age and train them under proper supervision and guidance.

6.49. Government of India have formulated a scheme of starting special sports schools in different regions of the country. According to this scheme, these schools will have sports and games as compulsory curricular subjects for which credit will be given in the examinations by the State Board of Examinations to which the schools are affiliated. Admission to the school will be made strictly on competitive basis through pre-determined tests evolved scientifically for exploiting potential talents from among promising boys and girls will be given special training and nourishment. The school will be a residential one and will require adequate land for construction of the school, hostels and playgrounds and other facilities for various sports and games. The State Government have taken up the question of location of one of the regional schools at Hazaribagh, where land is available. This should be pursued with the Government of India.

6.50. Apart from this scheme, some schools which have been doing good work in developing talents in certain games should be developed for conducting training, under proper guidance, in those games. For example, there are two or three schools in Chotanagpur area which have good standard of Hockey. It will be desirable to develop one of such schools as a centre for admission of those who show talents in the game of Hockey and train them. Hostel facilities and scholarships should be made available to the students selected on the basis of pre-determined tests and admitted to the school. Similarly, one or two institutions may be selected on the basis of the same criteria in each of the regions and developed as a special training centre for each of the important games and groups of sports activities. Selection of the talents should be made on merit on State basis and those admitted should be given scholarships and hostel accommodation and necessary and competent coaches and staff should be engaged in these schools.

CHAPTER VII

TEACHING METHODS AND EVALUATION

7.1. It has already been mentioned that the job-oriented education implies that the standard of school education should be high and should enable the individual student to develop skills in the disciplines for which they are best suited. Quality of education depends not only upon the contents of courses of studies, but also on the method of teaching and evaluation.

References have already been made to the fact that unfair means were adopted on a large scale for many years in the annual secondary school examinations and when these examinations were held under strict supervision, the percentages of those successful in these examinations fell down considerably. Complaints have been made that the traditional examination system in which candidates are examined for two, three or four hours at the end of one-year or two-year courses with a view to evaluating their knowledge and comprehension of the subject favours those who learn by rote and the lucky ones who make selective studies and guess right questions than those who study with a view to developing proper understanding and comprehension of the subject. Recommendations have been made by many for replacement of the traditional examination system by a better system which should aim at continuous and regular assessment instead of external examinations held for a few hours after intervals of one or two years.

7.2. Methods of teaching are very closely related to evaluation. It has been noticed that even in the traditional system of examination, the students of the schools of even backward areas whose teachers are properly motivated and where teaching is regular and private tuition by teachers is discouraged, fare better even in the traditional examinations than those of the other schools situated in more advanced areas whose teachers may have better qualifications but are not so well-motivated and who care more for private tuition and non-academic work than for teaching. While it is true that the traditional external examination system held for a few hours at intervals of one or two years favour many who learn by rote and sometimes lucky one who guess the right questions, there is no valid ground to believe that continuous internal assessment will solve all the problems created by the traditional examination system. The system of internal assessment was introduced, on a limited scale, in the secondary school examination in Bihar in 1950's, but this system led to abuses on a large scale and had to be given up. Validity of internal assessment based on semester system is being increasingly questioned even in a country like the U.S.A. where it has been widely adopted. There are complaints that there is a tendency among the teachers to be more liberal in internal assessment in order to please the students and earn popularity.

7.3. In any case, improvement in the quality of school education depends not only on a proper system of evaluation but also on proper teaching methods and adequate facilities in the school. References have already been made in Chapter III to the fact that many schools are ill-staffed and ill-equipped and suggestions have been made to improve facilities in them. Recommendations have also been made to improve the quality and contents of teachers' training programmes and for conducting in-service training programmes for teachers already in service.

7.4. A teacher generally follows the same methods of teaching which he himself has learnt. There are in the State very few teachers who take initiative in learning

new methods of teaching and carry out innovations. There are, however, few cases of teachers who take such initiative and carry out innovations in teaching methods. Such teachers will have to be encouraged and if their methods are found to be more suitable to the needs of students, other teachers may be encouraged to adopt them. The State Council of Educational Research and Training and the Training Colleges will have to play an important role in this respect. One of the important functions of the State Council of Educational Research and Training will be to carry on research, extension and evaluation. The research section of the State Council may pick up the few teachers who take initiative in evolving new methods of teaching and with their help and that of the training colleges should evolve suitable methods of teaching and extend methods which are found suitable among the teachers through the training colleges.

7.5. Suitable and proper methods of teaching should be incorporated in the guide books to be used by the teachers. There are some guide books for the teachers in respect of some subjects and some classes in the State. It is necessary that there should be a guide book for every subject and every sub-stage of school education. The old guide books need revision in the light of recent developments in the method of teaching.

7.6. Brief references have already been made in Chapter III regarding preparation of text-books. The Bihar Text-Book Committee—an autonomous body set up by the State Government has been now preparing and publishing text-books for different sub-stages of school education. It has so far prepared text-books for the existing classes I to IX excepting in respect of few subjects. However, it has prepared few text-books for the existing secondary classes X-XI. This Committee has already suggested in Chapter III relating to school education that the curricula for the subjects now recommended for study in different sub-stages of school education should be revised and that courses of studies from classes I—X of school education should be continuous to avoid repetition and duplication. It is necessary that the Text-Book Corporation should take up publications of all the text-books of all the subjects to be taught in different sub-stages of school education.

7.7. As already mentioned many text-books prepared by the National Council of Educational Research and Training have been adopted for teaching in school in the State with such adaptations as are considered necessary. In order that adaptations are relevant to the environment and needs of the State, the Committee has recommended that the State Council of Education should be more actively associated with the adaptations. As already recommended, the State Council of Education will have a separate section to deal with text-books and evaluation. This section of the State Council of Educational Research and Training should carry on systematic evaluation of the text-books prepared by the National Council of Educational Research and Training and of the other text-books which have been introduced in the schools of the State and on the basis of their evaluation suggest such modifications as are necessary. In this process, the Council will no doubt consult the teachers who teach these subjects in schools as well as the teachers of the training colleges.

7.8. An endeavour should be made to engage the best teachers and experts to write text-books on different subjects and adequate remuneration should be paid to them for this purpose. The results of evaluation carried on by the State Institute of Education should be made available to the writers. Drafts of text-books when prepared should be vetted by panels of experts. The State Council of Education has to take initiative in all these matters.

7.9. Complaints have been made that, in many schools, books other than those prepared by the Text-Book Corporation or other books prescribed for schools are used. Many sub-standard books are published particularly at the time of examinations and are used, in some cases, with the encouragement of the teachers, in large numbers by the students. Even if it be difficult to legally prohibit the use of such books in the schools, the Inspecting and Supervising Officers, if they are vigilant, can effectively discourage the use of these books in the schools. If any school persists in using such sub-standard books for teaching students, the question of taking disciplinary action against the teachers who use such books and even withdrawal of recognition of the schools, for preparing the students for their secondary school examination may be considered. For this purpose necessary provisions may have to be made in the conditions of recognition and grounds of derecognition.

7.10. However, the most effective way in which use of such books can be discouraged is to have a proper system of evaluation linked with the improved methods of teaching.

7.11. *Evaluation.*—As already mentioned there is only one external examination at the end of the existing secondary class XI. It has also been mentioned that one of the reasons for deterioration of the quality of school education and large failures in the secondary school examination is the fact that teaching work is neglected in the schools and there is no proper system of examination and evaluation in promotion from one class to another.

7.12. There is no doubt that continuous internal system of evaluation by the teachers who teach the students is theoretically the most satisfactory system of evaluation. However, as already mentioned, introduction of this system, even on a limited scale, in the schools of Bihar in 1950's proved to be a failure and had to be given up. Complaints were made that there was a tendency among the teachers to be very liberal in internal evaluation, so much so, that most of the students got 80 to 100 per cent marks in the 20 per cent marks earmarked for internal evaluation while many of them got not more than 5 per cent to 10 per cent marks in the remaining 80 per cent marks in the external examination. For successful implementation of continuous internal system of evaluation, teachers of integrity and devotion are required. There is also need for training teachers in the system of internal and continuous system of evaluation. It does not imply that on system of internal evaluation should be adopted till the quality of teachers improves. While efforts for improving the quality of teachers should continue, simultaneous efforts should be made to adopt the system of continuous internal system of evaluation and the schools whose teachers are found to be of proved integrity may be given increasing responsibility in this respect.

7.13. The Committee recommends that external public examination should continue, as at present, at the end of the secondary school stage (Class X). There should be another public external examination at the end of each academic year of the Higher Secondary Vocational stage to be conducted by the proposed State Council of Vocational Education and at the end of the Higher Secondary academic stream to be conducted by the Bihar School Examination Board. The system of internal evaluation for determining the performance of the students in the school and for promotion from one class to another should continue and complement the external public examination held at the end of the secondary stage and higher secondary stage.

7.14. There is, however, as already mentioned, need for improving the method of internal evaluation for improving the quality of school education.

7.15. In most of the schools even internal evaluation is not conducted in a satisfactory manner. Only one annual examination or at best one half-yearly and one annual examinations are held in most of the schools for promotion from one class to another. In some good schools, however, students are given home work and home work done by the students is examined and necessary guidance is given by the teachers to the students. This is in a way day to day internal evaluation by the teachers of the work of the students. However, schools in which home work is regularly given and examined are few.

7.16 The Committee recommends that, apart from teaching by the teachers in the schools, the students should be given guidance in regard to study and work outside the school hours and they should be examined by the teachers in respect of studies and home work done by them outside the school hours. The Committee also recommends that the achievements of the students should be assessed at regular intervals by the teachers. It has been suggested to the Committee that, while regular teaching work should be done from Monday to Friday, every Saturday may be reserved for examination and assessment of the students in the courses of studies completed by them. Examination and assessment may be held in one subject on every Saturday. This examination may be conducted for an hour or one hour and a half. The written answer papers may be examined on the same day and returned to the students. The grade or marks assigned to the students may be recorded in the continuous internal evaluation records maintained for the students of each class. The remaining hours of Saturday may be devoted to extra-curricular work like debate, dialogue, drama, work experience in field, field survey, sports, games, etc. The Committee broadly agrees with this approach and recommends that this system should be introduced in the schools.

7.17. These examinations and assessments on Saturdays should be supplemented by two examinations—one in May before the summer vacation and the other in November-December at the end of the academic term. Students should be examined in the courses taught from January to April in the examination in May, and from January to November in the examination in November-December. Overall performance of the students at the end of the academic term as indicated by the cumulative result of the assessment on Saturday, mid-term and annual examinations should be recorded in the comprehensive card to be maintained for each student.

7.18. Since classes IV, VI and VIII are the terminal sub-stages of primary and middle school education, it will be desirable for the school complexes, wherever they exist, to conduct these examinations. Even in the places where school complexes do not exist, the schools can be grouped together in a block for the purpose of the annual examination. It should be possible, with proper supervision and guidance by the supervisory officers of Education Department, for the school complexes or the groups of schools where complexes do not exist to ensure proper standards in evaluation.

7.19 Achievements of students should be judged not only on the basis of the examination held at the end of the academic term but on his overall performances in the weekly periodical and the annual tests. On this basis, if a student is unable to appear at an annual examination at the end of the academic term because of illness

or for some other reasons, he may earn his promotion to the next higher class, if his achievements in the periodical tests are satisfactory. On the other hand, a student who does well only at the examination at the end of the term will not earn a good grade or division if his performance in the periodical tests is not satisfactory.

7.20. The public external examination at the end of the secondary stage should continue to be conducted by the Bihar School Examination Board. Suggestions have been made that the public external examination should be improved by the introduction of the system of 'question bank'. According to this concept a student who is being examined should know as to how he is going to be examined. This is indicated by a large number of questions from different portions of the prescribed courses of studies and such questions when put together would constitute a 'question bank' and it is from these questions that a student knows what is expected of him in the examination. The method of preparation of 'question bank' has been indicated in a document entitled "Examination Reform—a plan of action published by the University Grants Commission". This may be seen in Appendix I.

7.21. Questions should not only aim at testing the knowledge of the candidates regarding acquisition of knowledge of a subject-matter but also for testing his ability to solve problems. For this purpose the question papers should consist of questions relating to problem solving, essay type questions, short answer type questions and objective type questions in right proportions. The question bank when prepared should also consist of these types of questions in right proportions. The idea of question bank covering all types of questions spread over the entire courses of study is no doubt attractive but, before it is tried on a very wide scale throughout the State, it would be desirable to introduce it on a pilot basis. Bihar School Examination Board should, in consultation with the State Council of Educational Research and Training which, as we have recommended, will have a separate wing of evaluation should prepare 'question bank' initially for annual examination of classes VIII and IX and, for the test examination for selection of candidates for the secondary school examination, and in co-operation with the selected schools, introduce it on a pilot basis in those schools. The results of the pilot scheme should be evaluated fully for introduction of this scheme on a wider basis.

7.22. In the meantime, Bihar School Examination Board, in consultation with the State Council of Educational Research and Training, should devise and carry out programmes of training of teachers in setting questions of the types mentioned above, namely, problem solving questions, essay type questions, and short answer type and objective type questions. When adequate numbers of teachers will have been trained and teaching in the schools is adapted to the requirements of such questions, secondary school examinations may be conducted on the basis of such questions.

7.23. The Bihar School Examination Board should not only concern itself with the public external examination held at the end of the secondary course but also take initiative and provide guidance regarding the internal assessment as suggested in the foregoing paragraphs. It should prepare detailed instructions regarding tests to be held on Saturdays, during the mid-term and at the end of the academic term. It may prepare questions for the mid-term and the annual examinations and make arrangements for test checking of the evaluations conducted by the schools and the school complexes. The Board should also prepare the format of the comprehensive card to be maintained for each student in the school.

7.24. Courses relating to methods of teaching in the training colleges should include methods of setting questions and evaluation of answers. During the period of apprenticeship training, the teacher should be asked to set questions and evaluate answers in the periodical examinations in the schools and performance of teachers in this respect should be evaluated in the overall assessment of the teachers' practical teaching work.

7.25. Another reform in the examination system which has been suggested is the introduction of grade system instead of mark system. The present system of assigning a mark to an answer script from 0 to 100 is subject to many uncertainties and does not really indicate the correct achievement of a student. For example, students getting marks between 60 to 100 are all declared to have passed in the first division. Similarly, students who have secured 45 per cent to 59 per cent marks are declared to have passed in the second division. Students securing 1, 2 or 3 marks less than the minimum of the first division marks are declared to have passed in the second division. Students securing 1, 2 or 3 marks less than the minimum pass marks are declared to have failed. It is difficult to be very exact in evaluation, except in answer to some questions in Mathematics or grammar or Science where one can be comparatively more exact, and the distinction between a student who has just secured 60 per cent and a student who has secured one or two marks less than 60 per cent and therefore, placed in the second division may not be real. Moreover, the existing scaling system of evaluating students' achievement has no real zero point and thus lacks comparability. In the circumstances, performances of students indicated by grade system may be more accurate. Performance may be indicated by 9 grades, in the initial stages which may be converted into six grades at a later stage as detailed below :—

Grades of evaluation (9)	Marks.	Final Grade. (6)
1. 80 to 100	...	Outstanding.
2. 70 to below 80	...	} Very good.
3. 60 to below 70	...	
4. 50 to below 60	...	Good.
5. 45 to below 50	...	} Satisfactory.
6. 40 to below 45	...	
7. 30 to below 40	...	Fair.
8. 20 to below 30	...	} Poor.
9. 0 to below 20	...	

7.26. Assignment of grades is already in force in many examinations at the school and the University stages in the country. There should be no difficulty in assigning grades to the candidates in place of exact marks. It will, however, be necessary to train teachers in this method of evaluation. It is recommended that the system of assignment of grade on the basis of nine grades of evaluation introduced in the secondary and higher secondary examinations to be held from 1977 or 1978. In

the meantime, grades should be assigned on the basis of internal assessment examinations held for promotion from one class to another. In the initial stages it would be desirable to have 9 grades as mentioned above but gradually it should be replaced by 6 grade system. After the adoption of the grade system each candidate will be assigned appropriate grade based on evaluation in each subject of the examination.

7.27. After the introduction of the grade system, no candidate will be formally declared to have passed or failed in the examination, but the Universities and the other higher educational and vocational professional institutions will have to prescribe, by regulations, the conditions for admissions into them. For example, the Secondary Board of Education may decide that only those whose overall grading is 6 will be admitted to the higher academic stream and the grades assigned to a student in different subjects will be taken into consideration in choice of subjects he wants to study. Similarly, the Universities may prescribe, by regulations, that only those candidates who acquire overall grade as 5 will be admitted to the 3-year degree courses and may be permitted to take up only those subjects in which they have secured grade 5 at the higher secondary stage and honours courses only in those subjects in which they have secured at least 4. Similarly, admission to the vocational courses, for which knowledge of mathematics and science is compulsory may be confined to those who have secured at least grade 5 in those subjects.

7.28. Similarly, Government will have to prescribe the minimum qualifications required for employment in various jobs. For example, the Government may decide that, for the post of a typist only those who have obtained the minimum grade of 5 or 6 in the secondary school examination and vocational certificate of typing will be appointed as typists. Similarly, the Government may decide that only those who have obtained the overall grade of 6 together with overall grade of 5 in mathematics and 6 grade in the vocational certificate in accountancy should be appointed to the post of accountant.

7.29. It has already been mentioned that, in the present circumstances, it is not possible to replace wholly the external examination by internal assessment. However, since internal assessment is a better method of assessment, efforts should be made to introduce it, wherever possible. The State Government have already decided that two well-known institutions in the State, namely, Netarhat Residential School and St. John's High School, Ranchi, may be permitted to introduce internal assessment. The State Government have also decided that 50 to 100 selected secondary schools of the State which have good reputation should be allowed to introduce internal assessment as a supplement to the external examination. The students of these 50 to 100 schools will have to appear at the external examination conducted by the Bihar School Examination Board and their achievements will be judged on the basis of their performance in the external examinations. There should, however, be a parallel column in the certificates or cards to be issued by the Bihar School Examination Board in which results of both the external and the internal assessment will also be noted.

7.30. The decisions taken by the State Government in this respect is a decision in the right direction. The performance of the schools which are permitted to introduce the system of internal assessment should be evaluated by a body of experts consisting of the representatives of the State Council of Educational Research and Training, Bihar School Examination Board and the Bihar Secondary School Board/Higher Secondary School Board.

7.31. Schools, other than the selected 50 to 100 schools who want to adopt internal assessment system as a supplement to the external examination should be inspected by the evaluation body suggested, and, such of them as are recommended by this

body may be allowed to adopt internal assessment as a supplement to the external examination system. Adequate precaution is necessary in this respect in view of the sad experience of internal assessment in the past.

7.32. In the chapter relating to school education it was mentioned that the final external examination at the end of class X should be held in two stages so that the load on the students appearing at the secondary school examination may not be heavy. Examinations may be held in the 'second Indian language' which will generally be the mother tongue for those whose mother tongue is not Hindi, and an Indian language, other than Hindi, in case of those whose mother tongue is Hindi and work experience (including theoretical and practical work) at the end of class IX or during the mid-term in class X just before or after the summer vacation. Questions will be set by the Bihar Examination Board and assessment will be made by two examiners, one internal and the other external selected by the Bihar Examination Board. The candidates will be examined in other papers at the final external examination to be held by the Bihar Examination Board. There should also be an internal practical test in physical activities (games, sports and exercises). The results of these examinations should be forwarded to Bihar School Examination Board and incorporated by the Board in the final assessment card.

7.33. In the higher secondary course (academic stream) of two years' duration, it is desirable to judge the achievement of students at the end of every academic term by public external examination supplemented by periodical internal examination. The Committee accordingly recommends that, in the Higher Secondary Academic courses, there should be two external examinations—one at the end of the first academic term and other at the end of the second academic term. The first examination should cover the courses to be studied during the first academic term and second examination should cover the courses to be studied in the second academic term. The grades/divisions of the candidates should be judged on the basis of the cumulative records of the performance of the students in the two examinations. These two external examinations in respect of Higher Secondary Academic courses may be held by the Bihar School Examination Board. Similarly, external examinations in respect of Higher Secondary Academic courses may be held by the Bihar School Examination Board. External examinations may be held by the State Council for Vocational Education at the end of the first, second or third year for the vocational courses ranging from 1—3 years.

These external examinations should be supplemented by assessment of the performance of the students in classes, in home assignments, and one mid-term internal assessment.

7.34. If the recommendations made by us in the foregoing paragraphs are to be implemented in a satisfactory manner, Bihar School Examination Board which has so far concerned itself with merely holding external examinations will have to take much greater initiative and play an active role in the matter of reforms in the examination system. It has to guide the schools in conducting internal assessment for assessing the performance of the students and for promotion from one class to another. It has also to train teachers in the matter of internal assessment. It has to take initiative to train teachers and carry out experiments with regard to 'question bank' before it is adopted on a wider scale. It has also to train and guide the teachers in assigning grades instead of marks. The Examination Board will have to carry on research in examination reforms and try the results of research on pilot basis before it is extended on a wider scale. The Committee strongly urges that the Bihar School Examination Board should take up all these functions without delay. If necessary, a directive should be issued by the Government for this purpose.

CHAPTER VIII

HIGHER EDUCATION

Scope for employment of persons with degrees and post-degrees in Arts, Science, Commerce, Agriculture, Animal Husbandry and Veterinary Science, Engineering and Technology and Medicine—Undergraduate and post-graduate courses in Arts, Science and Commerce.

8.1. As already mentioned in Chapter VI, the objectives of higher education, according to Robin's Committee's report on higher education (U. K.) are— (i) instructions in skills suitable to play a part in the general division of labour; (ii) what is taught must be taught in such a way as to promote general powers of mind; (iii) advancement of learning; and (iv) transmission of a common standard and common standard of citizenship.

In job-oriented higher education emphasis has to be placed on the first objective according to which education should be of some practical use. When the universities came into existence in Europe during the medieval period they were set up mainly as a training ground for church, medicine and law. Subsequently, their position, as centres of professional training in law and medicine declined, to some extent, and they developed more and more as centres of scholarship and knowledge and separate institutions were set up for training in profession of medicine, law, engineering, etc. However, many of these centres for training in various professions have now been brought under universities or have been constituted into separate universities. Higher education is concerned with the training in professions and the imparting of academic or 'pure' as well as of 'applied' knowledge. Even though the degree and post-graduate degree courses in the humanities, social sciences, and natural sciences may not directly train persons for any professions, persons studying these courses may join civil services, become teachers or applied scientists, secure employment in industries and commerce or become self-employed. While education and training in law, medicine and engineering, applied commerce, etc., are 'vocational' and professional, education leading to degrees in the humanities, social sciences and natural sciences enable young people to acquire knowledge and skills which may help them in entering civil services, teaching professions, or industries and business or to take up self-employment. In considering job-oriented higher education we have, therefore, to consider not only the professional courses but also the courses in humanities, social sciences and natural sciences with reference to their utility for employment including self-employment

8.2. *Civil Services.*—Civil Services under the Central and State Governments provide employment to a large number of persons with degrees and post-graduate degrees in various disciplines.

(a) The Union Public Service Commission holds competitive examinations for recruitment to the following services, a degree for which is the minimum qualification :—

- (i) Indian Administrative Service;
- (ii) Indian Foreign Service;
- (iii) Indian Police Service;
- (iv) Indian Forest Service;

- (v) Indian Statistical Service;
- (vi) Indian Economic Service;
- (vii) Central Services, including Central Information Service;
- (viii) Indian Audit and Accounts Service;
- (ix) Indian Customs and Central Excise Services;
- (x) Indian Defence Accounts Service;
- (xi) Indian Income-tax Service;
- (xii) Indian Ordnance Factories Service;
- (xiii) Indian Postal Service;
- (xiv) Indian Railway Accounts Service;
- (xv) Indian Railway Traffic Service;
- (xvi) Military Land and Cantonment Service;
- (xvii) Central Secretariat Service, Class II;
- (xviii) Railway Board Secretariat Service, Class II;
- (xix) Indian Foreign Service, Branch 'B';
- (xx) Armed Forces (Headquarters) Civil Service;
- (xxi) Customs Appraiser Service;
- (xxii) Military Lands and Cantonment Service, Class II; and
- (xxiii) Assistants' Grade Examination.

(b) The Union Public Service Commission holds examinations for recruitment to the following Engineering technical services :—

- (i) Engineering Service Examination for recruitment to Engineers for Indian Railways;
- (ii) Central Engineering Service;
- (iii) Central Electrical Engineering Service;
- (iv) Indian Ordnance Factories Service;
- (v) Telegraph Engineering Service;
- (vi) Central Water Engineering Service;
- (vii) Mechanical Engineers;
- (viii) Military Engineering Service;
- (ix) Central Power Engineering Service;
- (x) Telegraphic Traffic Service;
- (xi) Posts of Mechanical Engineers for Geological Survey of India; and
- (xii) Posts of Assistant Drilling Engineers.

A degree in Engineering/Technology in the relevant branch is the minimum qualification for admission to the examination.

(c) The Union Public Service Commission holds an examination for recruitment of Geologists. For admission to this course a candidate must hold M. Sc. degree in Applied Geology.

(d) Recruitment to many posts for which a degree or a post-graduate degree is the minimum qualification is made by the Government on the recommendations of the Union Public Service Commission who assess the merit of the candidates by interviewing them with the assistance of experts in the relevant branches.

8.3. *Recruitment of degree holders to the Armed Forces.*—Degree holders with 'C' certificate in N.C.C. are recruited to the commissioned rank of Armed Forces on the basis of interview and recommendations by the Services Selection Boards.

Persons with degrees are also recruited as short service commissioned officers on the basis of the interviews and recommendations by the Services Selection Boards. Persons with honours degree or post-graduate degree are recruited as officers for the educational and administrative branches of the Armed Forces. Their recruitment is also made on the basis of interviews and recommendations by the Services Selection Board. Degree holders in Engineering and Technology are recruited for the technical branches of the Armed Forces.

8.4. (a) The State Government holds a combined competitive examination for the recruitment to (i) Bihar Civil Service (Executive Branch); (ii) Bihar Police Service; (iii) Bihar Education Service; (iv) Bihar Finance Service; (v) Bihar Labour Service; (vi) Bihar Education Service; (vii) Assistant Registrar, Co-operative Societies, etc. The minimum qualification for admission to this examination is a degree. It also holds an examination for the recruitment to Bihar Civil Service (Judicial Branch). A degree in law is the minimum qualification for admission to this examination. A degree in law is a post-graduate degree.

(b) The Bihar Public Service Commission also holds examination for recruitment to the Junior Supervisory posts—Subordinate Education Service (inspecting branch and equivalent posts), Junior Auditor (Co-operative Department), Labour Welfare Officer, Inspector, Co-operative Societies, Labour Inspector, etc. The minimum qualification for recruitment to many of these posts is a degree.

(c) The State Government appoints those who possess degrees or post-graduate degrees in Arts, Commerce and Science and Bachelor's degree in Education as teachers in Government Secondary Schools and Junior Supervisory and Inspecting Officers under the Education Department.

(d) The State Government and offices under them recruit some degree holders to some miscellaneous posts.

8.5. Degree and post-graduate degree holders in Agriculture and Animal Husbandry and Veterinary Science are mostly employed under the Agriculture and Animal Husbandry Departments and in the institutions under the Rajendra Agriculture University. Recruitment by the State Government is made on the advice of the Public Service Commission and recruitment to subordinate posts is made on the advice of Selection Boards. Recruitment to the posts under the University is made by Rajendra Agricultural University itself. Some agricultural graduates may find employment in Indian Council of Agricultural Research or the institutions under it. Some graduates in Agriculture are appointed by the Banks in connection with promotion and processing of credit for agricultural operations and some are appointed by fertiliser concerns in connection with promotion of sales of fertilisers.

8.6. Civil Engineers are employed by the State Government in appreciable numbers in their Works and Irrigation Departments. The State Government employ some Electrical Engineers and only a few Mechanical Engineers. Recruitment to gazetted posts under the Engineering Services in the Engineering, Works and Irrigation Departments is made by the State Government on the recommendation of the State Public Service Commission. Recruitments to some lower posts like Engineering Assistants are made by the State Government or Chief Engineers on the basis of the recommendations of the Selection Committee.

8.7. Graduates in Medicine are mainly employed by the State Government to man their Health and Medical Services. Some are appointed as teachers of Medical

colleges managed by the Government or private bodies. Some big public and private sector undertakings provide health and medical services for their own employees and employ graduates in medicine and surgery. Some of them also take up self-employment and practise medicine and surgery.

3.8. Industrial and business organisations require personnel with degrees or post-graduate degrees in different disciplines in the following types of jobs :—

(i) *Personnel Management and Industrial Relations.*—Persons with degrees or post-graduate degrees or diplomas in behavioural sciences, labour and social welfare courses in personnel management and industrial relations, or business management with specialisation in personnel management and industrial relations are appointed to the jobs under this group.

(ii) *Business Economics.*—Those who obtain degrees or post-graduate degrees in applied economics/commerce including project evaluation, public finance, international trade, economic analysis or degrees or diplomas in business management with specialisation in these areas are preferred for the jobs available under this group.

(iii) *Finance, Cost and Accounts.*—Financial Management is of vital importance in industrial and business undertakings. It includes financial and cost accounting, financial and budget management, management accounting, taxation in business decisions, etc. Persons with qualifications of chartered accountants and cost and works accountants and broad knowledge of financial matters of industry and business as well as those who obtain degrees or diplomas in business management with specialisation in finance are preferred for these positions. For subordinate positions of accountants and auditors in industries, business banks and insurance companies graduates in Commerce, Economics, Mathematics and preferably with the qualifications of having passed intermediate examinations of Chartered Accountancy or Cost and Works Accountancy are preferred.

(iv) *Marketing including marketing in foreign countries.*—Marketing includes sales, advertisement, sales in foreign countries, market survey and analysis, sales forecasting, sales management, rural marketing, etc. Persons with degree preferably in Economics/Commerce, Science, Engineering and Technology with training in marketing or degree and diploma in business management with specialisation in marketing are required for marketing of various types of products. Knowledge of science is required for the marketing of scientific and chemical products. A degree in engineering is required for the marketing of products of engineering concerns. Medical graduates or science graduates with relevant training are required for the marketing of medical products. Knowledge of foreign language (s) is desirable for marketing in foreign countries (export).

(v) *Production Control/Operation Management.*—It includes production management, production and inventory control, maintenance and replacement study in industrial engineering methods of critical path analysis. Persons with degree in Engineering in relevant branch with training in various methods of production control and preferably with degrees or diplomas in business management with specialisation in production control are suitable for the jobs under this group. Persons with degrees in any discipline but preferably in engineering and training in inventory control are required for inventory control/materials management.

(vi) *Quantitative Methods*.—This includes Statistics, operational research, linear programming, data processing and system analysis, management information system, etc. Persons with degrees in applied mathematics, statistics or engineering with relevant training and preferably with degree or diploma in business management with specialisation in quantitative methods are suitable for the positions under this group.

(vii) *General Management*.—This includes the areas of management policy, control system, planning system, etc. Higher management personnel and their deputies and assistants in industries and business are concerned with management policies. Higher management personnel have to acquire experience of different areas of industrial and business management. Those who possess degrees or diplomas in business management with specialisation in control and planning are suitable for the positions of deputies and assistants.

Persons who set up their own industries and business concerns and who want to operate them on modern lines will be able to have better control over them, if they possess the knowledge required for general management or/and of the different areas mentioned above.

8.9. Many of the Public Sector Undertakings including Hindustan Steel Ltd., Life Insurance Corporation, Nationalised Banks and Indian Oil Corporation and some of the important private sector undertakings recruit trainees, by open advertisement, and train them for various positions in different areas referred to in the foregoing paragraphs. Some of them hold competitive examinations which are open to graduates and post-graduates who secure 1st class or high second class marks (not less than 55 per cent in aggregate) in their degree/post-graduate degree examinations. Others make selection by interviewing the candidates. Many public and private undertakings recruit personnel required by them for various branches on the campuses of the well known-management institutes and engineering institution with very good reputation.

8.10. *Subordinate positions*.—Many graduates in Arts, Science and Commerce are employed in subordinate positions like those of Accounts-Assistants or Clerks, General-Assistants or Clerks, typists and stenographers and Personal Assistants under the Government as well as in Industries, Commerce and Banks. As has been mentioned in the earlier Chapters, a degree in Arts, Science and Commerce need not be the minimum qualifications for such jobs. A Secondary School Examination certificate and certificate or diploma or training in the relevant vocation or profession are adequate for such positions. The Committee has already made specific recommendations regarding the training at the certificate and diploma levels to be imparted for training personnel of these categories for meeting requirements of personnels of these categories. If those recommendations of the Committee are implemented, degree holders will not be required for these categories of jobs. There will, however, be still some junior supervisory posts under the Government as well as in industries and business concerns for which degree holders may be required. The numbers of such positions will, however, not be very large. Recruitment to most of these position is made by open advertisement and often by competitive examinations in which candidates are examined in language (essay) and general knowledge and also Mathematics for positions for which knowledge of Mathematics is required.

8.11. *Teachers*.—An important area in which sizeable numbers of degree-holders or post-graduate degree holders are required is that of teaching. The largest numbers of teachers are required for primary and middle schools. The minimum qualification required for the teachers of the primary schools and most of the teachers of

middle schools is a certificate in secondary school examination followed by a certificate in teachers' training. Only a few graduates are recruited for the middle schools. The minimum qualification required for teaching in secondary schools is a degree and a Bachelor's degree in Education. The position regarding requirements of teachers and the type of training to be imparted to them has been examined in detail in Chapter V of the report. One of the important recommendations made by the Committee regarding teachers' training is to introduce education as one of the elective subjects in the undergraduate course. As already indicated in Chapter V, the requirement of additional teachers for secondary schools during the fifth plan period is estimated at 10,000. Some teachers for languages, mathematics, civics and sciences will be required in vocational/technical institutions if and when they are set up in pursuance of the recommendations of the Committee.

Teachers of colleges and the Universities are required to possess at least a second class post-graduate degree in the disciplines which they are required to teach. Persons with consistently good academic records should be preferred for teaching. Some teachers with consistently good academic records and with research degrees are preferred for teaching in honours and post-graduate courses. The minimum qualification for teaching in Engineering Colleges is a degree in the relevant branch of Engineering. The Committee has recommended that there is no need for new colleges in Arts, Science or Commerce. However, with the introduction of Higher Secondary academic courses and 3-year degree courses, there will be requirements of teachers with post-graduate qualifications on a modest scale. Persons with at least second class post-graduate degrees will be required for 2-year Higher Secondary academic courses. Persons with honours degrees or post-graduate degrees will also be required, as a consequence of the implementation of the recommendations of the Committee, for elementary teachers training colleges and non-technical subjects of vocational/technical institutes.

8.12. The existing position of employment and employment potentials of degree and post-graduate degree holders in Arts, Science, Commerce, Agriculture, Animal Husbandry and Veterinary Science, Engineering and Technology and Medicine in important sectors of economy and social activities of the State are briefly reviewed in the following sub-paragraphs :—

(a) *Agriculture*.—As already mentioned, Agricultural graduates and post-graduate degree holders are employed mostly under the State Government and Rajendra Agricultural University. A few may find employment under the Government of India and the research institutions under them. A few agricultural graduates are employed by Banks in connection with grant of credit for agriculture and a small number are employed by fertilizer concerns in public and private sectors for promotion and use of fertilisers. However, very few agricultural graduates and post-graduate degree holders take up self-employment in agriculture. As already mentioned, self-employment sector provides employment to the largest number of persons in the State. It has already been mentioned that the main reason for this is the low productivity in agriculture and the tendency of educated persons is to seek security in paid and secure jobs. It should be possible for some of the agricultural graduates who come from landowners' families to take up such employment in agriculture, if it is modernised and amenities are provided in rural areas. If the Committee's recommendation regarding establishment of agricultural polytechnics is implemented, a number of agricultural graduates with practical experience will be required to work as teachers in those polytechnics.

(b) *Mining*.—The State produces about 39 per cent of the minerals produced in the country. Coal-mining which is the most important mineral produced in the State is in the public sector. Iron-ore mining which is the next important mineral in the State is partly under the public sector and partly under the private sector. Other minerals are mostly in the private sector. Mining, Electrical and Mechanical Engineers are required for mining. There is no difficulty in meeting the demand of Electrical and Mechanical Engineers for mining sector; in fact, some of the Electrical and Mechanical Engineers are unemployed. There are no degree courses in Mining Engineering in any of the Engineering Institutions of the State. Indian School of Mines, located at Dhanbad is an All-India Institution. It conducts courses in Mining Engineering and admission to that institution is made on merit on All-India basis. There are plans for large-scale development for coal mining in the fifth and subsequent plans and mining engineers are required in increasing numbers for these development programmes. The Committee has, therefore, in its report, recommended that degree courses in Mining Engineering should be introduced in the Bihar Institute of Technology, Sindri without delay.

The position regarding non-engineering personnel required for industries and commerce including the mining sector such as Personnel and Industrial Relations Officers, Sales Officers, Materials Management Officers, Administrative Officers, etc. and the qualifications required for them have been dealt with in paragraph 8.9.

(c) *Manufacturing Industries*.—As already mentioned there are some important public sector and private sector manufacturing concerns in the State, the important among them being (i) Tata Iron and Steel Co. Ltd., Jamshedpur, (ii) Tata Engineering and Locomotive Works Ltd., Jamshedpur, (iii) Bokaro Steel Ltd., (iv) Sindri Fertiliser Factory and Barauni Fertilizer Factory under Fertiliser Corporation of India, (v) Indian Oil Refinery, Barauni and (vi) Heavy Engineering Corporation. There are some medium scale industries in the State. These include Sugar Factories, Engineering concerns, Foundries, etc. The growth of medium-scale and small-scale industries in the State has not kept pace with the development of large-scale industries and has been slow. New areas near the sites of the large-scale industries are, however, being developed and small-scale industries are being set up in these areas. Young people of the State including engineering graduates and graduates in other branches are, however, reluctant to take up self-employment in small-scale industries. Self-employment in small-scale industries can provide employment to a number of persons. The qualities required for self-employment in small-scale industries are entrepreneurship, self-confidence, knowledge of market, and the qualities required for co-ordinating production, marketing and management.

There is no difficulty in meeting the current requirements of large-scale, medium-scale and small-scale industries for engineering graduates. In fact, as already mentioned, there is some degree of unemployment among the engineers.

The position in respects of non-engineering personnel for branches like personnel management and industrial relations, purchase and stores, administration, etc. required by manufacturing industries has been broadly covered under the head 'Business Management'.

8.13: *Construction*.—Civil Engineers are required for construction of roads, bridges, irrigation works, flood protection works, factory buildings, office buildings and residential quarters. Mechanical Engineers are required for erection of mechanical plant and equipment and electrical engineers are required for erection of electric installations. The State Government are the largest employers of Civil engineers. Industrial, mining and business concerns employ civil engineers as well as mechanical and

electrical engineers. Engineers in various branches are required for preparing lay-out and design of construction and erection. Mechanical engineers are required for design of equipment. There is no difficulty in the supply of civil, mechanical and electrical engineers in the State; in fact, as already mentioned, some engineers are waiting for jobs.

Almost all the construction work of the State Government and most of the construction work of industrial, mining and business concerns are done through contractors. Although big contractors employ a few engineers, small contractors do not generally employ engineers. There is one important public sector construction undertaking known as Hindusthan Steel Works Construction Co. Ltd., which is currently engaged in construction and erection of Bokaro Steel Limited. It employs a large number of engineers. The State Government have offered incentive to the engineering graduates to take up construction work, but many of them prefer to remain unemployed or get employed even in small paid jobs rather than to take up construction work as contractors. This is mainly due to lack of entrepreneurship want of confidence and aversion to hard sustained work.

8.14. *Trade, Commerce and Banks.*—Trade in the State is largely a self-employment sector. Few residents of the State with degrees take up self-employment in trade. Banks employ a number of degree-holders as executive personnel who are recruited mostly on the basis of All-India competitive examinations and subordinate accounts and clerical personnel. Persons with degrees in commerce or service, or even with aptitude for figures and considered reliable are recruited to these subordinate positions.

8.15. *Transport.*—Railways are the most important means of transport in the country. Recruitment to various executive positions in the Railways or for subordinate supervisory positions for which a degree is the minimum qualification is made either on the basis of competitive examinations or by open competitions conducted by the Union Public Service Commission and the Railway Service Commissions.

The State Transport Corporation undertaking employs a few engineers and other personnel for which degree is the minimum qualification. The number of such persons employed is not very large and the employment potentials of degree-holders in the State Transport undertaking are not significant.

The remaining transport sector is a self-employment sector, which is not attractive to the degree holders. The requirement of capital for self-employment in transport business is heavy. It should be possible to encourage some educated young persons to form co-operatives and raise with assistance from the Government and apex co-operative institutions, necessary capital for operating transport business.

8.16. Some of the specific professions and employment positions in which there is some scope for employment of degree or post-graduate degree holders in various branches are, briefly, discussed below :—

(i) *Accountants and Auditors.*—As already mentioned industrial and business organisations require persons for accounts and financial management. Executive positions in these branches are open to those who qualify themselves through stiff professional examinations, as Chartered Accountants and Cost and Works Accountants. There is comparatively good scope for employment of qualified Chartered Accountants and Cost and Works Accountants. Comparatively a very small number of candidates from Bihar qualify themselves as Chartered Accountants and Cost and Works Accountants.

(ii) *Bio-Chemist*.—In all the Universities of the State there is provision for undergraduate and post-graduate courses in Chemistry. Although there is some scope for employment of bio-chemists, there is no provision for these courses in the Universities and Colleges.

(iii) *Book Industry*.—With the spread and development in education, Book Industry will develop. Book Industry including book-production and book-selling are largely in the self-employment sector. There is no provision for training in this industry. There is need for formal education and training in this branch.

(iv) *Company Secretary*.—Companies registered under the Indian Companies Act, with a minimum share capital are required to employ Company Secretaries from among those who have passed the Company Secretary's examinations. There is no arrangement in the State for preparing students for Company Secretary's examination and the number of persons from the State qualifying as Company Secretaries is comparatively small.

(v) *Computer operation and data processing*.—Although computers are not being, at present, used on a large scale in the industrial and commercial organisations, it is one of the areas in which demand for trained personnel will grow in the future when not only industries and commercial concerns will have to computerise many of their operations but even the State Government will have to take the help of computers in rationalisation their accounts and some of the operations relating to personnel. There is, therefore, need for a computer training centre in the State.

(vi) *Dentists*.—With consciousness for dental care and spread of education there is need for a larger number of Dental Surgeons than the numbers available now. There is only one College of Dentistry in the State.

(vii) *Domestic or Home Science*.—Although Domestic Science is taught as one of the subjects in the undergraduate course, there is no regular degree course in Domestic Science in any of the Universities of the State. There is increasing demand for course of Domestic Science among the girl students. Many women who want to continue to look after household affairs after completing their education would like to obtain degrees in Domestic Science. The Committee has already recommended introduction of diploma course in Domestic Science as a post secondary vocational course. If this recommendation is implemented, there will be need for a number of teachers in Domestic Science. Graduates in Domestic Science will also be useful for Health and Hospital services and Hotel management.

(viii) *Engineers and technologists*.—Although, there is no scope for any significant expansion for degree courses in Civil, Electrical and Mechanical Engineering Course, there is need for specialists in some of the branches as discussed below :—

(a) *Agricultural Engineering*.—Although agriculture is the most important economic activity in the State and there is need for modernising it and improving and manufacturing the equipment and appliances required for modernisation, there is no agricultural engineering course in the State. With the development and modernisation of agricultural sectors, the need for Agricultural Engineers will gradually increase.

(b) *Coal Technology*.—Mention has already been made of the need for development on a large scale of coal as the most important source of energy and fuel in the country. Apart from the fact that fuel technologists are

required in Steel Plants and Fertilizer Plants, the development of coal as the most important source of energy and fuel will need fuel technologists.

- (c) *Mining Engineering*.—As discussed in Chapter 4, however, there are needs for Mining Engineers in view of development of coal mining on a large scale during the fifth and the subsequent plans. The Committee has, therefore, already recommended that a Mining Engineering course should be introduced in B.I.T., Sindri.
- (d) *Refractory and Ceramic Engineering*.—There is a sizeable refractory industry in the State. A few Refractory Engineers can find employment in them. A few will also find employment in steel industry and coke ovens.
- (e) *Industrial Engineering, operating research and work study*.—The undergraduate course in production engineering in B.I.T., Sindri, aims among other things at training students in industrial engineering and work study. Industries and business concerns have been using industrial engineers and persons trained in work study in increasing numbers. Persons with post-graduate degree in industrial engineering are likely to find employment in industries and business concerns.
- (f) *Electronics and communication engineering*.—With the development of sophisticated industries and communication, the requirement of persons with degree in electronics and communication engineering has been increasing. There is need for degree as well as post-graduate degree courses in electronics and communication engineering.
- (vii) *Environmental Science*.—With the need for study of space and proper use of land and minerals and prevention of pollution, environmental science consisting of Meteorology, Geography, Botany (Ecology) and Geology are assuming increasing importance and can provide employment to a few persons. They also satisfy the tests for relevance to environment.
- (ix) *Forestry and timber technology*.—As already mentioned, forest occupies about 18 per cent of the areas of the State. Except for a small portions of North Champaran district, forests are spread over mostly districts of Chotanagpur, portion of Santhal Parganas and Monghyr. Officers including Range Officers required for administration and conservation of forests and utilisation of timber are trained in the Indian Forest College and Rangers' College at Dehra Dun. Subordinate personnel such as Foresters and Forest Guards acquired by the Forest Department are trained in the Forest School and Forest Guard's School maintained by the State Government. All the forests are now owned and managed by the State Government and there is little scope for development of forestry by private persons. However, persons with the knowledge of forestry and timber technology are required by paper factories and timber concerns.
- (x) *Journalists—Editors and Reporters*.—These are employed by newspapers. Degree holders with good command over language (English or Hindi) find employment in journalism. A degree or diploma in journalism will be an additional qualification for such persons. There is no Degree or Diploma Course in Journalism in any University of the State at present. Some degree holders with command over language and with the additional qualification of a degree or diploma in journalism can find employment as Public Relations Officers in Public or Private sector undertakings.

(xi) *Languages*.—There is scope for employment as interpreters, translators and teachers, of those who specialise in important languages of the world like English, Russian, German, French, Chinese, and Japanese. There is no provision for teaching in the Universities in the State foreign languages other than English.

(xii) *Librarianship*.—With the increase in numbers of libraries and educational institutions there is demand for persons trained in library science. There is no course in library science in any of the universities of the State. There is need for post-graduate degree/diploma course in library science in one of the Universities of the State.

(xiii) *Music and fine arts*.—There is limited scope for employment for those who have specialised in music. Music teachers are required in schools, especially in those in which girls are educated. Those who specialise in music can also teach boys and girls in their homes.

(xiv) *Micro-biologists—Bacteriologist*.—Persons with the knowledge, at a high level, about growth, development, control and utilisation of Bacteria and other Micro-organisms, viruses affecting plant, animal and human life and industrial processes are required for research experiment and preparation of weakened strains of harmful bacteria for utilisation in vaccination, immunisation and seriological application. Technicians to help research workers in this field are also required.

(xv) *Nursing*.—Degree in nursing is required for higher positions in nursing professions including nursing officers in the medical corps of the armed forces. There is no provision for degree courses in nursing in the State.

(xvi) *Personnel Management and Industrial Relations*.—Persons with degree/diploma in Personnel Management and Industrial Relations/Labour and Social Welfare find employment in industries and business concerns. Industries and Business concerns employing a minimum number of persons are required to employ as Labour Welfare Officers those who possess degrees or diplomas in these subjects. Persons who obtain degrees and diplomas in these subjects from well reputed institutions conducting courses in these subjects have comparatively better chances of employment. However, persons with degrees and diplomas from institutions which do not enjoy good reputation find difficulties in employment.

(xvii) *Pharmacists*.—Pharmacists are employed by pharmaceutical and drug industry and as teachers in medical colleges. While there is a school of pharmacy for conducting a post-secondary diploma course in the State, there is no provision for degree course in pharmacy in any of the medical colleges. Birla Institute of Technology at Mesra, Ranchi has recently introduced a degree course in pharmacy. There is need for, apart from the degree course in Pharmacy at Birla Institute of Technology, a degree course in pharmacy in one of the medical colleges of the State.

(xviii) *Physicist (Nuclear)*.—Physicist (nuclear) are required in increasing numbers for application of knowledge about nuclear physics to peaceful purposes including application to agriculture, industry and medicine.

(ix) *Physicist (Radio and Electronics)*.—As already mentioned, electronic equipment are being used in increasing numbers by industries, railways, etc. Persons trained at a higher level in electronics are required for designing and production of electrical equipment and for solving industrial and technical problems relating to them.

(xx) *Physiology*.—Students of the medical courses are taught *Physiology*. According to prevailing practice in the State, medical graduates teach *Physiology*. Medical graduates are, however, reluctant to teach *Physiology* and want to concentrate on their main disciplines relating to medicines and surgery. *Physiology* is included as one of the subjects to be taught in the Higher Secondary courses. *Human Biology* is a part of *Biology* in Secondary courses. Teachers with degree in *Physiology* will, therefore, be required for teaching the students of Secondary and Higher Secondary courses.

(xxi) *Physicians and Surgeons*.—Only those who successfully complete five-year degree course in medicine after Intermediate in Science and one or two-year interneeship in big hospitals qualify themselves for practising as physicians and surgeons. References have already been made in the earlier chapters that State requires about 30,000 graduates in medicine and surgery as against the existing numbers of about 10,000 but the cost for turning out the medical graduates is so high that it is not possible to produce a large number of graduates in medicine. However, suggestions have already been made in Chapter IV for training skilled personnel to increase the effectiveness of the medical services in rural areas. There are, at present, four medical colleges managed by the State Government and five medical colleges conducted by the non-Government medical agencies. There is need for more medical graduates, but, in view of the high cost involved in medical education and difficulty in finding funds for more medical colleges as also in view of the reluctance of the medical graduates to go to the rural areas and need for medical and health care in the rural areas, the Committee has recommended training of medical auxiliaries and para-medical personnel to meet these needs.

(xxii) *Sports instructors and officers*.—Sports instructors are employed mostly in schools and colleges. Sportsmen get preference for a limited number of employment positions in some of the big public and private sector undertakings who encourage sports among their employees. There is a Government College of Physical Education in which post-graduate diploma course is conducted. There is scope for employment of sports and physical instructors in other States also and some private organisations and persons have opened some ill-equipped institutions and they are charging high capitation fees from candidates from other States. There is scope for employment of physical and sports instructors. There is also need for some Secondary and Higher Secondary schools in which sports and physical instruction can be given a prominent place along with other curricula.

(xxiii) *Travel agency and Tourist guides*.—The numbers of tourists visiting India have been increasing every year. There are some ancient historical sites and places particularly in Patna, Nalanda and Gaya districts. Some forest areas declared as national forests attract visitors. Travel Agencies are also required for making arrangements for persons visiting important industrial and mining areas. There is need for persons trained as Travel Agents and Tourist Guides.

8.17. *Existing degree and post-degree courses in Arts, Science and Commerce*.—Students studying degree and post-degree courses in the Universities and colleges of the State have generally the choice of studying and being examined in the following subjects :—

(A) Degree Courses in Arts (Humanities and Social Sciences).

(1) *Language*.—Modern Indian Language and Literature, Hindi, Urdu, Bengali, Nepali, Oriya and Maithili.

(2) *Modern European languages and literature.*—English, Russian, German or French. However, facilities exist for teaching of English only. Candidates who want to be examined in any other foreign language have to study, on their own, that language.

(3) *Classical language and literature.*—Sanskrit, Persian, Pali, Prakrit, Arabic and Persian.

(4) History, Philosophy, Mathematics, Economics, Political Science, Home Science, Geography, Psychology, Music, Statistics, Anthropology, Ancient Indian History and Culture, Labour and Social Welfare. There is provision for examination in criminology and forensic science in one University.

(B) *Sciences (Natural Sciences).*—Chemistry, Mathematics, Physics, Botany, Zoology, Geology, Statistics. In one University Geography, Anthropology and Criminology and forensic Science are also included as subjects in the examinations for Bachelor's degree in Science.

(C) *Commerce.*—Economic, Mathematics and Banking, Business Organisation and Administration, Accountancy and Book-keeping, Commercial Law, Business Administration and Industrial relations, Public Finance and International Trade, Company Law and Management, Business, Statistics.

8.18. There are two types of courses conducted for the Bachelor's degree in Arts, Science and Commerce—Ordinary pass course and Honours course. The general scheme of study is that the students studying ordinary pass course have to compulsorily study Hindi. In some universities, students are also required to study compulsorily English or any other modern Indian language. In addition, they have to study three subjects from the groups of subjects mentioned in paragraphs 8.17. In some universities students are required to study only one subject out of the group(s) comprising languages and literatures and two other subjects from the remaining subjects. In Patna University a student is required to study English as one of the subjects and two other subjects. In Mithila University, a student may study up to two subjects relating to the language and literature and only one subject from the remaining subjects. Each of the three subjects a student is required to study for Bachelor of Arts degree consists of three papers of 100 marks each.

8.19. A student studying for Bachelor's degree in Science is required to study three subjects out of the groups of subjects included in the courses of studies in Science; each subject excepting Mathematics, consists of 2 theoretical papers and 1 practical paper of 100 marks each. Mathematics consists of 3 papers of 100 marks each.

8.20. A student studying for Bachelor of Commerce degree has to study 10 papers (including language) of 100 marks each

8.21. A student studying for Honours degree in Arts has to study 3 additional papers which he chooses for his Honours degree. Similarly, a student studying for Honours degree in Science excepting Mathematics has to study and is examined in

4 theory papers of 100 marks each and 2 practical papers each of 100 marks in the subject which he has selected for study for Honours degree. A student studying for Honours degree in Commerce has to study 3 additional papers relating to Commerce.

8.22. Students studying for post-graduate degree in Arts, Science and Commerce have the choice of studying one of the following subjects :—

Arts—Humanities and Social Sciences :—

- (i) Ancient Indian History and Archaeology, Anthropology, Arabic, Bengali, Economics, English, Geography, Hindi, History, Labour and Social Welfare, Maithili, Mathematics, Pali, Persian, Philosophy, Political Science, Psychology, Sanskrit, Sociology, Statistics, Urdu and Oriya.
- (ii) *Sciences*.—Mathematics, Chemistry, Physics, Botany, Physiology, Zoology, Geology, Geography, Statistics, Applied Psychology, Anthropology (although Physiology is included as one of the subjects for examination of Masters of Science degree of one University, there is no provision for teaching the subject in any University).
- (iii) *Commerce*.—Commerce is only one subject and the candidates studying for Master's degree in Commerce have to study six compulsory papers relating to the Economics Analysis and the Applied Economy, Modern Industrial Development in India, Business Management and Administration, Corporate Finance, Company Law and Administration, Management and Accounting. In addition they have to study one more subject out of the group of subjects consisting of Advance Accountancy, Actuarial Science, Labour Organisation, Management and Welfare International Trade and Foreign Exchange, Company Law, Management and Administration in India, and Principles and Practice of Marketing. One of the universities provides for compulsory practical training of 100 marks. In another university, there is a *viva-voce* test carrying 50 marks.

8.23. According to the scheme of studies and examinations Master of Arts degree, a student has to study and is examined in 8 papers of 100 marks each. Candidates studying for Master's degree in Science have to study and are examined in 5 theoretical papers of 100 marks each, in 3 practical papers of 100 marks each.

8.24. It will appear that the subjects taught in the undergraduate and post-graduate courses of all the universities of the State are more or less the traditional subjects. There has been explosion of knowledge particularly in sciences and social sciences during the period of second world war and it has become difficult, particularly at higher level for a person to acquire in depth all the knowledge to be acquired in different branches of a subject. In fact, many major branches of important subjects have each now become a separate discipline, particularly at the level of special honours and post-graduate courses in advanced countries. For example, Nuclear Physics and Biophysics have become separate disciplines. Similarly, Biochemistry, and Micro-biology have also become separate subjects of studies. There is, therefore, need in the universities of the State for providing specialised courses, particularly at the special honours at post-graduate levels in new branches of studies. Since application of knowledge of many of new branches of studies is required for solving

technological economic and social problems, there is need for not only study of the fundamentals in these branches, but also of the applied aspects.

8.25. *Introduction of new courses of studies.*—The reviews made regarding scope for employment of different categories of personnel and of the existing degree and post-degree courses in various branches bring out that there is scope for introduction of the following new courses at the degree and post-degree levels in the State :—

A. HUMANITIES AND SOCIAL SCIENCES

(i) *Book Production.*—A post-graduate diploma course in Book Industry covering courses of studies on printing and production, marketing and sales promotion, accountancy and library science should be introduced in Patna University.

(ii) *Library Science.*—Post-graduate degree as well as diploma courses in Library Science may be introduced in Patna University.

(iii) *Journalism.*—A one-year post-graduate diploma course in Journalism with not more than 30 admissions a year may be introduced in Patna University. Those who are good in languages, particularly Hindi and English should be admitted to this course.

(iv) *Languages—*

(a) *German and French.*—Post-graduate diploma course in German and French may be introduced in Patna University with about 20 admissions in each.

(b) *Russian Language.*—A post-graduate diploma course with 20 admissions may be introduced in Ranchi University.

(c) *Chinese and Japanese* —A post-graduate diploma course in Japanese is already being conducted in Nava Nalanda Mahavihar, Nalanda. A post-graduate diploma course in Chinese may also be introduced in Nalanda Nava Bihar and Bihar University, Muzaffarpur.

(d) *Nepalee.*—Mithila University has provision for conducting examinations in Nepalee. It will be desirable to introduce a post-graduate diploma course in Nepalee in Mithila University, Darbhanga.

(v) *Music and fine arts.*—Degree courses in Music may be introduced in Patna and Ranchi Universities.

(vi) *Personnel Management and Industrial Relations.*—In view of the Industrial and Mining Complexes situated near Ranchi, arrangements for teaching of Personnel Management and Industrial relations, a subject already included in the examination of Ranchi University should be made at the post-graduate level in that University.

(vii) *Social Work.*—The demand for trained social workers will increase with the increase in complexity of social problems. There is need for such trained workers to look after social and psychological problems of sick persons and delinquents.

A post-graduate degree course in 'Social Work' may be introduced in Patna University.

B. MATHEMATICS AND SCIENCES.

(i) *Bio-chemistry*.—A post-graduate degree course in Bio-chemistry with not more than 16 admissions a year should be introduced in Patna University.

(ii) *Botany (Economic)*.—There is need for specialisation in study of plants, trees, edible oil etc. for industrial purposes and the conditions necessary for their growth, development and utilisation. An elective course in Botany (Economic) may be provided in Honours degree and post-graduate courses in Botany in all the Universities.

(iii) *Computer operation and data processing*.—Diploma and Certificate Courses should be introduced in Computer operation and data processing in Patna and Ranchi Universities.

(iv) *Domestic/Home Science*.—A degree course in Domestic/Home Science may be introduced in Patna University. This may also be introduced in one of the Agricultural Colleges under Rajendra Agricultural University.

(v) *Micro-biology-Bacteriology Department*.—A post-graduate course in Micro-biology-Bacteriology may be introduced in Patna University. This course should be conducted by the post-graduate science department of the University of Patna, in collaboration with Patna Medical College.

(vi) *Geo-physics*.—Geo-physics may be introduced as a post-graduate degree course in Patna and Ranchi Universities.

(vii) *Physics*.—There should be provision for teaching of the following three branches in the post-graduate course of Physics in the Universities of the State :—

(a) General Physics.

(b) Nuclear Physics.

(c) Physics (Radiology and Electronics).

(viii) *Physiology*.—Physiology may be introduced as one of the subjects of Bachelor's degree in Science and as a post-graduate degree course in Patna and Ranchi Universities.

(ix) *Meteorology and environmental sciences*.—Meteorology may be introduced as one of the elective subjects for Bachelor's degree in Science in one of the colleges of Patna, Ranchi and Bihar Universities. It should be possible for at least some of the colleges in which Meteorology is introduced to teach environmental science with Meteorology, Geography, Geology and Botany (Ecology).

C. ENGINEERING.

This will be discussed in the Chapter relating to Engineering Education.

D. MEDICAL COURSE.

(i) *Dentistry*.—The College of Dentistry at Patna may be expanded to provide for a larger intake of students. Alternatively a new Dental College may be established at Muzaffarpur under Bihar University.

(ii) *Medical Course for Junior Health and Medical Personnel*.—There is need for a medical course with emphasis on practical aspects of health and medical care to meet the health and medical requirements of the rural areas. This should be a course for training Junior Medical Personnel. This will be further discussed when medical education is discussed.

(iii) *Nursing*.—A degree course in Nursing may be introduced in Patna and Ranchi Medical Colleges under Patna and Ranchi Universities respectively.

(iv) *Pharmacy*.—A degree course in Pharmacy may be introduced in Patna University. Introduction of this subject deserves very high priority.

E. MISCELLANEOUS.

(i) *Forestry*.—Forestry and timber technology may be included as one of the elective subjects for Bachelor's of Science degree in Ranchi University and Agricultural College, Ranchi and Rajendra Agricultural University, Ranchi.

(ii) *Physical Education and sports instructors*.—Physical education and sport instructors course may be included as one of the elective subjects for pass degree course in some of the important colleges in each of the Universities of the State. The University will no doubt select such colleges for this course as have adequate facilities for it. A college of Physical Education and Sports Instructors course should also be established at Ranchi.

(iii) *Travel Agency and Tourist Guide*.—This course may be introduced as a post-graduate diploma course in Patna and Magadh Universities.

8.26. *Re-orientation of courses of Commerce*.—Although the courses of studies of Commerce deal mainly with practical aspects and operational skills relating to industry and business, the method of teaching them have over a period tended to become more theoretical and to centre round books and there is inadequate emphasis on practical problems. While it is necessary that the students should have the conceptual knowledge of economics and structure of industry and business, it is also necessary that they should have the knowledge of practical aspects and the operational skills of industrial and business organisations. It may perhaps be desirable to designate the courses of studies now grouped under the heading "Commerce" as "Business Studies" in order to emphasise the practical aspects of the studies and re-orient the courses so that they adequately deal with practical aspects of industrial and business problems.

8.27. It has already been mentioned that there is dearth in the State of Chartered Accountants and Cost and Works Accountants. Persons coming to the profession with degrees in commerce have to qualify themselves as Chartered Accountants and Cost and Works Accountants. One of the ways in which the courses in commerce can be made job-oriented is to re-orient the courses in such a way that they may help the students completing Bachelor's degree in Commerce in qualifying for Chartered Accountants and Cost and Works Accountants.

8.28. In order to qualify as a Chartered Accountant a person who has passed the degree examination of an University has to work as an articled clerk under a qualified

Chartered Accountant for a period of three years or as an audit clerk for a period of four years and pass the Intermediate and Final Examinations conducted by the Institute of Chartered Accountants, India. Candidates who desired to appear at these examinations have to enrol themselves as students of the Institute of Chartered Accountants, India, who coach the students by supplying materials for study and text-books. The following subjects are included in the Intermediate and Final Examinations of Chartered Accountancy :—

Paper no.	Names of subjects.	Depth of knowledge required.
1	2	3

INTERMEDIATE EXAMINATION.

Paper 1	Accounting	Expert knowledge.
Paper 2	Accounting and Elements of Income-tax law—	
	(a) Company Accounts ...	Expert knowledge.
	(b) Elements of Income- tax Law.	Reasonable working knowledge.
Paper 3	Cost Accounting	Expert knowledge.
Paper 4	Auditing	Ditto.
Paper 5	Mercantile Law, Company Law and Industrial Law.	Candidates will not be expected to be called upon to give expert legal opinion.
Paper 6	Business Mathematics and Statistics.	Reasonable working knowledge
Paper 7	Organisation and Management	Basic knowledge.

FINAL EXAMINATION.

Paper 1	Advanced Accounting and Auditing.	Expert knowledge.
Paper 2	Financial Management ...	Reasonable working experience.
Paper 3	Management Information and Control systems.	Basic knowledge.
Paper 4	Cost Records and Cost Control	Expert knowledge.
Paper 5	Auditing	Expert knowledge.
Paper 6	Company Law and Secretarial Practice.	Expert knowledge.
Paper 7	Direct Tax Laws	Expert knowledge.
Paper 8	Economics and National Accounting.	Reasonable working knowledge.

In addition any two of the following papers :—

Addl. Paper 1	Corporate Management	Reasonable working knowledge.
Addl. Paper 2	Operations Research and Statistical Analysis.	Reasonable working knowledge.
Addl. Paper 3	Managerial Economics	Reasonable working knowledge.
Addl. Paper 4	Systems Analysis and Data Processing.	Basic knowledge.
Addl. Paper 5	Production and Inven- tory Control.	Reasonable working experience.
Addl. Paper 6	Tax Planning and Tax Management.	Expert knowledge.
Addl. Paper 7	Management and Opera- tional Audit.	Expert knowledge.

8.29. *Cost and Works Accountant*.—In order to qualify himself as a Cost and Works Accountant, a person who has passed the Intermediate Examination of any University or an equivalent examination and has registered himself as a student of the Institute of Cost and Works Accountants of India and after undergoing a course of tuition either postal conducted by the Directorate of Coaching Administration of the Institute or oral imparted by such colleges, institutions and organisations as are recognised by the Director of Studies of the Institute, has to pass the Intermediate and Final Examination conducted by the Institute. The Institutions recognised, at present, in Bihar by the Directorate of Coaching Administration of the Institute are—

- (1) Bokaro—Bokaro Steel Ltd., Finance and Accounts Division, Bokaro Steel City, district Dhanbad.
- (2) Jamshedpur—Lions Club School of Accountancy, Balika Vidyalaya, Sakchi (Jamshedpur).
- (3) Patna—Cost Accountancy Coaching Centre, Bihar Industries Association, Sinha Library Road, Patna.

The subjects of examination in the Intermediate and Final Examinations for Cost and Works Accountants are—

I. INTERMEDIATE EXAMINATION.

- I. Business Organisation.
- II. Economics.
- III. Industrial Law.
- IV. Mercantile and Company Law.
- V. Elementary Mathematics and Elementary Statistics.
- VI. Book-keeping and Accountancy.
- VII. Factory Organisation and Engineering.
- VIII. Cost Accountancy—Prime Cost.
- IX. Cost Accountancy—Overhead.
- X. Cost Accountancy—Method.

II. FINAL EXAMINATION.

- Paper 1—Cost Audit and Management Audit.
 Paper 2—Advanced Accountancy.
 Paper 3—Taxation.
 Paper 4—Mathematics and Business Statistics.
 Paper 5—Financial Management.
 Paper 6—Principles and Practice of Management.
 Paper 7—Cost Systems, Mathematics and Control.
 Paper 8—Applied Costing.
 Paper 9—Quantitative Techniques and Data Processing.

8.30. Perusal of the degree and post-graduate degree courses of commerce of the universities in the State indicated that while these courses include economics business economics, economic development in India and specified countries money, banking

and international trade, excepting in Ranchi University, in which the degree courses include compulsory study of mathematics and statistics which are also the compulsory papers of examination in the examinations of Chartered Accountants and Cost and Works Accountants, they are not included as the subjects of compulsory study in the degree and the post-graduate degree courses in Commerce in the other universities of Bihar. Advanced Accounts, Auditing and Industrial relations are only optional papers in the degree and post-graduate degree courses of the Universities of the State, whereas they are compulsory papers of examinations for the examinations of Chartered Accountants and Cost and Works Accountants. Cost Accounting is not included in the courses of studies of the degree and the post-degree courses of the Universities. Taxation and Tax Laws which are included in the subjects of examinations of Chartered Accountants and Cost and Works Accountants are not included in the courses of studies of the Universities.

Mention has also been made of the requirements of Company Secretaries in appreciable numbers. Every Company registered under the Indian Companies Act has to maintain a Secretary. The work of a Company Secretary involves preparation of agenda papers, reports, information and minutes of the meetings of the Board of Directors and Shareholders. The Secretary also complies with the legal requirements of the Indian Companies Act. Additional duties of a Company Secretary may include administration, accounts, contracts, legal matters or public relations.

8.31. A person who has passed one or more of the following examinations is entitled to appear at the Intermediate and Final Examinations conducted by the Institute of Company Secretaries of India for Companies Secretaries:—

- (a) Preliminary examination conducted by the institute in (i) English, (ii) Elementary Book-keeping, (iii) Elements of Commerce, (iv) Commercial Geography and General Knowledge, (v) Elementary Economics;
- (b) B. Com. (Hons. or Pass);
- (c) A degree in Law;
- (d) Master's of Business Administration;
- (e) Final Examination of Institute of Chartered Accountants of India or Cost and Works Accountants of India; and
- (f) A graduate in any other disciplines with not less than 50 per cent marks.

Candidates who possess the qualification of M. Com. (with Accountancy as main subject), or possess a degree in Law, or has obtained B. A. (Hons.) or M. A. in English is exempted from appearing in Accountancy, Principles of Law and English respectively.

8.32. Candidates for position of Companies Secretaries are examined in the following subjects in the Intermediate and Final Examinations:—

INTERMEDIATE EXAMINATION.

- (i) Accountancy,
- (ii) Principles of Law,
- (iii) English,
- (iv) Secretarial Practice,
- (v) Company Law.

FINAL EXAMINATION.

GROUP I.

- (i) Advanced Accountancy (including Company's Taxation),
- (ii) Company's Secretarial Practice,
- (iii) Business Administration and Management.

GROUP II.

- (iv) Mercantile Law (including Labour, Legislation and Practice Bonus Act),
- (v) Economics,
- (vi) Company Law and MRCT Act.

Before the candidate is admitted to the Intermediate Examination he has to be registered with the Institute of Companies Secretaries of India and obtain a certificate from the Director of Studies or the heads of the coaching organisation set up by the Institute to the effect that he has undergone a course of postal tuition satisfactorily for a period of six months.

8.31. Very few students with the Bachelor's degree in Commerce from Bihar University are able to qualify for the professions of Chartered Accountants and Cost and Works Accountants. As already mentioned, the professional examinations held by the two institutes are quite stiff. Many of the subjects included in the examination for these two professions are not included in the courses of studies for Bachelor's degree in Commerce. Since there are, at present, only three coaching centres recognised by the Institute of Cost and Works Accountants and only a few Chartered Accountants in a few of the major towns in the State, even the students who want to study for qualifying themselves for these two professions find difficulty in obtaining proper guidance. The teachers of subjects of Commerce have themselves no experience of actual practice obtaining in industrial and commercial concerns; nor have the necessary competence to guide the students who want to prepare for qualifying themselves as Chartered Accountants and Cost and Works Accountants.

8.32. One way of helping the students who may want to qualify themselves for these professions is to re-organise and re-orient the courses of Bachelor's degree in Commerce with a view to incorporating in them the subjects and area of studies which will be useful for the examinations of Chartered Accountancy and Cost and Works accountancy. Accordingly the Committee recommends that, apart from the subjects now included in the courses of studies,

- (i) Business Mathematics and Statistics,
- (ii) Statistical and Operational Analysis, and
- (iii) Advanced Accountancy including elements of cost should be included as subjects for compulsory study for Bachelor's degree in Commerce.

In addition--

- (i) Auditing,
- (ii) System analysis and data processing,
- (iii) Direct Tax Laws,

- (iv) Management information and control system,
- (v) Production and inventory control,
- (vi) Factory Organisation and Engineering, and
- (vii) Marketing.

may be included as elective subjects, especially in Honours courses. Students who desire to qualify themselves for the two professions may study some of the elective subjects.

8.33. If the subjects which are more relevant to the future careers of the students who want to qualify themselves as Chartered Accountants or Cost and Works Accountants or Company Secretaries are included in the courses, it will also be necessary to recruit as teachers persons who can teach these subjects and give a practical bias to them. Persons who have qualified themselves as Chartered Accountants and Cost and Works Accountants and gained experience of accounts and financial management and Company Secretaries in industry and business should be eligible for recruitment as teachers and in the Department of Commerce (Business Studies) and Applied Economics of the universities and important colleges conducting these courses there should be some teachers with these qualifications. If necessary, regulations for the qualifications of teachers of Commerce may should be amended for this purpose.

8.34. Courses of Studies in Commerce should include not only theoretical study of business organisation, systems of accounts maintained by them, and the management information and control systems, but the students should be enabled to study them in industrial and business organisations. For this purpose, students should be attached as far as practicable, to different industrial and business organisations and guided in the practical study by teachers as well as executive personnel of those organisations. Persons dealing with accounts and financial matters of industrial and business organisations should be invited to speak to the students on practical problems relating to business management, organisation and finance.

8.35. If these steps are adopted, it should be possible to locate coaching centres, at least in the Departments of Commerce of the universities and some of the important colleges in which qualified chartered accountants and cost and works accountants are appointed as teachers and get them recognised by the institutes of Cost and Works Accountants. Even if adequate numbers of teachers with these qualifications are not available, such centres can be conducted by co-operative efforts of the colleges and these industrial and business organisations in places like Patna, Ranchi and Jamshedpur, where Chartered and Cost and Works Accountants are available in adequate numbers.

8.36. *Introduction of Honours Course in Applied Economics, Accounting and Finance.*—The other and the more effective method of helping the students who have the desire to qualify themselves as Chartered Accountants and Cost and Works Accountants and who want to take up accounting and financial control as their professions and are capable of doing so, is to introduce a new subject of "Applied Economics, Accounting and Finance". Since this will be a high level course, it should be taught only as a combined Honours course. (The concept of combined Honours course has been discussed later in this chapter). The subjects of study should

include among others (i) Applied Economics, (ii) Business Organisation, (iii) Mercantile and Company Law, (iv) Cost and Management Accounting, (v) Financial Accounting and Auditing, (vi) Business Mathematics and Statistics, (vii) Statistical and Operational Analysis, (viii) Tax Planning and Tax Management, (ix) Management Information and Control System, and (x) Factory Organisation and Engineering.

8.37. There should be ten papers each of 100 marks for examination in this special honours course. One of two papers should include practical training in industrial and business concerns. Those who offer this combined Honours course should offer Mathematics or Economics as the subsidiary subject for the degree course. In addition, they will study Hindi (one paper of 100 marks) and English (one paper of 100 marks).

8.38. The Committee has later recommended in this chapter that combined Honours course should be conducted under the direct supervision of Patna, Ranchi, Bhagalpur and Bihar Universities. If the standard of courses and teaching remains high, some students who will do well in this course should be able to qualify themselves as Chartered and Cost and Works Accountants. Some of the students who do not qualify these professional examinations may find jobs relating to accounting and financial control in industrial and business concerns. This course will also be useful to those who take up self-employment in small-scale industries.

8.39. If this course becomes a high level course and acquires reputation it may also be possible to get exemption at least in some papers from the examinations conducted by the two institutes of Chartered and Cost and Works Accountants.

8.40. In view of the courses of studies recommended for this combined Honours course, the teachers of the Accounts and Finance subjects should possess professional qualifications of Chartered Accountancy or/and Cost and Works Accountancy or/and post-graduate degree and diploma in Business Administration with specialisation Accounts and Finance. Teachers of Applied Economics should possess post-graduate degree in Applied Economics and preferably experience of working as Applied Economists in Industrial or Commercial concerns.

8.41. Constituent and affiliated colleges who have been conducting courses in Commerce (to be designated as business studies) may continue to conduct the courses to be modified in accordance with the recommendation made by the Committee in paragraph 8.31.

8.42. *Other courses oriented towards jobs in industries and business.*—In the foregoing paragraphs, the Committee has made suggestions regarding changes in the courses for degree and post-degree examinations with a view to making them oriented towards jobs of Chartered Accountants and Cost and Works Accountants. As mentioned in paragraphs 8-9 of the report, the other main areas in which industrial and business organisations require personnel are—

- (i) Personnel management and Industrial Relations;
- (ii) Business Economics;
- (iii) Marketing including Marketing in foreign countries;
- (iv) Production Control and Operation Management including Production and Inventory Control;

- (v) Maintenance and Replacement;
- (vi) Industrial Engineering and methods of critical path analysis;
- (vii) Quantitative methods; and
- (viii) General Management.

8.43. *Personnel Management and Industrial Relations*.—All industries and Mining concerns employing a minimum number of persons are required, under the provisions of the Bihar Factories Act and Indian Mines Act, to employ Labour Welfare Officers. Bigger organisations employ, in addition to Labour Welfare Officers as required under the statutes, Personnel and Industrial Relation Officers and managers. Generally persons with degree or diploma in Labour and Social Welfare/Personnel Management/Industrial Management are employed in these positions.

8.44. Universities of Patna and Bhagalpur conduct post-graduate course in Labour and Social Welfare. Bhagalpur University also conducts under-graduate course in Labour and Social Welfare. There is provision for post-graduate course in Labour and Social Welfare in Ranchi University, but the University does not conduct any teaching work in these courses. An organisation connected with St. Xaviers' College, Ranchi conducts a post-graduate course in Social Welfare. Xaviers' Institute of Industrial Relations, Jamshedpur conducts a post-graduate Honours Diploma course in Personnel Management and Industrial Relations. Admission to this course is made on all-India basis and only a small number of persons from Bihar are admitted to this course.

8.45. In view of the existence of Industrial Complexes in and around Ranchi, it is desirable that Ranchi University should conduct the post-graduate degree course in Labour and Social Welfare without delay.

Courses of study for the post-graduate degree in Labour and Social Welfare include—

- (i) Labour and Social Economics;
- (ii) Labour and the State;
- (iii) Labour and Management;
- (iv) Personnel Management;
- (v) Labour Organisations and Industrial Relations;
- (vi) Industrial Psychology;
- (vii) Labour Legislation;
- (viii) Labour and Welfare Administration and field work and project work.

Candidates are also required to appear at an oral examination. Before the award of the degree, a student is required to have at least six months' field work during which period he investigates the conditions of work in factories, welfare activities, trade unions, employer's organisations, employer and employee relations under the supervision of the teachers of the faculty. After completion of the field work, the student submits a written report.

8.46. The field work is intended to make the course oriented towards the jobs to which the candidates may be appointed on completion of the course. Since the courses in Labour and Social Welfare are job-oriented, it is desirable that there should

be arrangements for teaching by those who have practical experience of personnel management and industrial relations. Teachers of these courses, like teachers of any other courses are required to possess a post-graduate degree in that discipline. A percentage of teachers to be appointed to teach these courses should also be required to possess, in addition to the post-graduate degree, practical experience of at least three years in personnel management, industrial relations and social welfare. If persons with this experience are not available, some of the younger teachers should be seconded to industries for acquiring practical experience. In a place like Ranchi which is located in industrial area, it should be possible to engage persons with at least post-graduate degrees in Labour and Social Welfare and who are already working in industries as part-time teachers. Personnel Managers and Industrial Relations Officers of Industrial and Business concerns should be invited to talk to the students on practical problems relating to personnel management and industrial relations. The Department of Labour and Social Welfare should also arrange seminars to which persons already working in industries should be invited.

8.47. There are, at present, no under-graduate and post-graduate courses in the Universities of Bihar which prepare students in other areas of management including business, economics, marketing, production control operation management, production and inventory control, quantitative methods and general management. An institute of business and economic development has been set up at Muzaffarpur and affiliated to Bihar University. This institution is located in an agricultural area and will find it difficult to maintain close touch with the important industrial and business concerns which, except for the complexes at Barauni, are located in South Bihar at considerable distances from it. An institution preparing managerial personnel for industrial and business concerns should be located in close proximity of such concerns and should be in close touch with them.

8.48. The three well-known institutes of management at Calcutta, Ahmedabad and Bangalore provide for high-level management development programmes. Xavier's Institute of Industrial Relations at Jamshedpur also provides a post-graduate management development programme as well as programme for training personnel officers and industrial relations officers. Some universities and some other institutes also conduct courses in management. The number of candidates from Bihar admitted to these institutes is comparatively small. Some of the reasons for this, as brought out in the discussions with the authorities of Xavier's institute of industrial relations, Jamshedpur are the failure of the candidates from Bihar to do well in objective tests and to show adequate alertness and to express adequately in English in interviews. There is justification for location of such an institute in the industrial and mining areas of the State. Ranchi will be the most suitable place for location of such an Institute. Establishment of such an institute will involve heavy non-recurring and recurring expenditure, and, unless Government of India provide bulk of the finances required for establishment of the institute, it will be difficult for the State Government to provide finances for location of such an institute. The State Government should take up with the Government of India a proposal for location of an institute of management at Ranchi.

8.49. In the meantime a post-graduate 2-year-course in "Business Management Studies" with elective subjects for specialisation in (i) Personnel Management and Industrial Relations, (ii) Marketing, (iii) Finance, and (iv) Production including inventory control and quantitative techniques may be introduced in Ranchi University. This course should cover the basic disciplines like Economics, Behavioural Sciences, Accounting and Mathematics and functional areas like Business or

Merchantile law, Business policy and Communication, Management Control Systems, Organisational Behaviour and Management Information system. In addition, it should provide, as already mentioned, elective courses for specialisation in Personnel Management and Industrial Relation, Marketing, Finance and Production and Quantitative techniques. Some of courses relating to Applied Economics, Accounts and Finance, this course may be common.

The number of admissions at the initial stage should not exceed 30. The number of admissions has to be kept low in the initial stage, because the method of teaching as discussed below will differ from the traditional pattern of teaching in our universities and colleges and will be student centred and it will be necessary to have a system of continuous internal evaluation. It is also necessary to ensure that the products of this course, on completion of the course, should be able to compete with the products of well established courses in the management institutes of this country for jobs in industries and business. Admission to the course will be made on merit based on past academic records, experience, if any, and written tests, personal interview and group discussions.

8.50. The method of teaching should be such as to provide not only the conceptual knowledge, but also necessary skill for making decisions in 'real situations'. The students on this course will have to participate in the process of learning actively. Besides lecture group discussions, seminar discussions, presentation of papers, case studies and project assignment will have to be adopted.

8.51. The method of evaluation of the achievements of the students in this course should be a continuous process of evaluation based on participation in class, home assignment, presentation of paper and discussions and periodical and final examinations.

8.52. The teaching staff for this course should have, uniformly good academic records and preferably practical experience of industries and business. It may be necessary to engage part-time persons already working in the industries and business concerned in and around Ranchi. Guest speakers from industries and business will also have to be invited. In order to fully utilise the resources of this course, arrangement should also be made for part-time courses, for those who are already working in industry and business.

8.53. Since this course will be on a pattern very different from that from the traditional course in the universities and the colleges, it may be desirable to treat the department as an autonomous unit under the university.

8.54. The Institute of Business Management and Economic Development already located at Muzaffarpur may, in view of its location, provide specialised courses in agricultural and irrigation management programme including the problems of land management, water management, agricultural production, agricultural finance, role of co-operatives in the agricultural finance. This institute should maintain close liaison with Rajendra Agricultural University which is located at a place not very far from it

8.55. *Academic and other requirements for recruitment to executive positions in industries, business, banks and under the Government.*—As mentioned in paragraph 8.10, some of the public sector undertakings and some of the important private sector undertakings recruit trainees by open advertisement and some of them hold competitive examinations which are open to graduates and post-graduates with

first class and high second class marks (not less than 55 per cent or in some cases 50 per cent marks in the aggregate). The written examinations are conducted in English. The candidates who qualify in written examinations have to appear at a viva-voce tests which are also generally conducted in English. Other undertakings make their selections by interviewing the candidates. These interviews are also generally conducted in English. In the written examinations candidates are examined in (i) essay writing and (ii) general knowledge. In order to compete for recruitment by these concerns, a candidate should be able to express himself well in writing as well as in oral tests. He should also be able to write good essays, be able to answer questions relating to general knowledge on various topics including History, Geography, Sciences, Current Economics and Political Affairs, etc.

8.56. *Subjects and standard of the examinations conducted by the Union and the State Public Service Commissions.*—Candidates appearing at the examinations conducted by the Union Public Service Commission for recruitment to All-India and Central Services other than the Engineering Services referred to in paragraph 8.2(a) have to appear in the following compulsory subjects:—

Subjects.	Marks.
(1) Essay	150
(2) General English	150
(3) General Knowledge	150

In addition they have to appear at three optional subjects out of a number of subjects included in the disciplines of languages and literature, social sciences, sciences, law and applied mechanics. The questions the candidates have to answer in the three optional papers which they have to choose are of honours degree standard.

Bihar Public Service Commission holds a combined competitive examinations for recruitment to State Services. It also holds an examination for Bihar Civil Services (Judicial Branch). The candidates for these examinations have to appear in the following compulsory subjects:—

Subjects	Marks
General Knowledge (Current Affairs)	150
Elementary General Science	100
General Hindi	100

The candidates who appear at the competitive examinations have to appear in three subjects from four groups consisting of languages and literature (Group A), Social Science (Group B), Public Administration, International law and Constitutional law (Group C) and Mathematics, Statistics, Science, Accounts and Agriculture (Group D). A candidate cannot appear in more than one subject from the group relating to language and literature and two subjects from each of the other groups. Candidates appear at the competitive examination of Bihar Civil Service (Judicial Branch) have to appear in law subjects.

8.57. The standard of syllabuses of different subjects in which candidates are examined for State Services by Bihar Public Service Commission is that of the honours degree of the Patna University in the relevant discipline. It will, therefore, appear that those who want to compete for Central Services, Class I and State Civil Services have to study two or three subjects with the syllabuses of honours standard. Students of some subjects like history of law can choose two papers from the subject of history or law.

8.58. Another area in which persons with the knowledge of undergraduate courses in different disciplines of good honours standard and of good post-graduate degrees are required is the profession of teachers for Universities and Colleges conducting post-graduate and undergraduate courses. The minimum qualification required for recruitment of a Lecturer by the University or College is a second class post-graduate degree in the relevant discipline. Persons with honours degrees are preferred, although honours degree is not a compulsory qualification for recruitment. There are, at present, a number of lecturers already working in various colleges including those which conduct under-graduate courses of honours standard who do not possess honours degree.

8.59. For the post of the Reader which is the next higher grade of teachers, lecturers with five years' teaching experience in honours classes or partly in honours and partly in post-graduate classes are considered. For the post of University Professors teachers with research degree of the doctorate standard or published work of high standard and with ten years' experience of post-graduate teaching in a University or College and adequate experience of conducting research and record of continuing research are considered.

8.60. Persons already working as lecturers are given advance increments in their pay, if they obtain research degrees like Ph. D., D. Litt. or D. Sc. The Committee understands that the system of giving advance increments to those who secure research degrees has resulted in considerable deterioration in the quality of thesis for complaints have been made that some persons with no genuine interest in research have been producing theses on subjects which do not require application of high order and which are not of high quality in order to get advance increments.

8.61. A teacher who has to teach the students of post-graduate classes and honours classes or even of pass courses should possess knowledge of the relevant discipline in depth. The frontiers of knowledge of one discipline extend over those of related disciplines, and the modern tendency is to promote interdisciplinary approach in studies of different subjects, particularly those relating to social sciences and physical and biological sciences. As discussed earlier, those who want to compete for jobs under the Central and State Governments and industrial and business concerns have to study at least 2 or 3 subjects in some depth. Teachers who have to teach such students of honours degree and post-degree classes are required to possess knowledge in depth of at least one discipline and in some depth of related disciplines. In addition, they should have uniformly good academic records.

8.62. Teachers of the secondary schools are required to possess degrees of a University in the subjects which they are required to teach in schools and a degree or diploma in secondary school teachers' training course. The Committee has recommended in Chapter V that the teachers of the elementary teachers training colleges should possess honours degree in the subject they have to teach. Teachers of Higher Secondary Course should, as recommended by the Committee possess, at

least a second class post-graduate degree in the subjects they have to teach. It will be of advantage, if they also possess honours degree in the subjects they have to teach

8.63. Persons who want to do research work or work as Scientists in National Laboratories should possess in depth knowledge of the disciplines in which they have to carry on research work or work as scientists.

8.64. Persons who want to take up self-employment in agriculture, industries, business or any other tertiary activities should have studied two or three subjects preferably including the subject (s) relevant to the area of self-employment in breadth and in some depth and should be able to express themselves well in writing and orally. They should have ordinary knowledge of Mathematics to understand accounts and problems of purchase and marketing.

8.65. Some persons with knowledge in breadth of 3 subjects up to degree standard may be suitable for the positions of junior supervisory personnel or senior assistant in industries, business, transport, etc., or under the Government.

8.66. To sum up, on the basis of requirements of the jobs and occupations available for those who study the humanities, Social Sciences and Sciences, persons with the knowledge upto honours degree standard in three subjects are required for the executive positions under the Central and State Governments; persons with adequate knowledge of disciplines relating to different areas of management and accounts or/and persons who have good knowledge of basic social sciences, sciences, engineering technology, current affairs and have studied one or two subjects in depth and possess good powers of oral and written expressions are required for the managerial and supervisory position in industries and tertiary sectors; persons with depth of knowledge in a particular discipline and some knowledge of related subjects are required to work as teachers in the Universities and Colleges; and persons with study of two/three subjects of ordinary degree standard are required for junior supervisory positions and the positions of senior assistants under the Central and State Governments, in industry and tertiary sectors and as teachers in secondary and higher secondary schools. Those who take up self-employment in agriculture, industry or tertiary sectors after obtaining their degree may find useful knowledge (including applied knowledge) of 2 or 3 subjects together with skills relevant to their area of self-employment and good powers of oral and written expressions.

8.67. Undergraduate courses are, at present, conducted in the Colleges of the State at two levels—pass course and honours course. A student studying pass degree course has to study (i) Hindi of one paper with 100 marks or Hindi of one paper with 50 marks and mother tongue of one paper with 50 marks, (ii) language and literature to be selected from Modern Indian Languages, classics and foreign languages of 3 papers each with 100 marks. A student of an honours course has to study and is examined in three additional papers in the subjects which he studies for honours course and has to secure a minimum of 45 per cent marks to get an honours degree in that subject.

8.68. As already mentioned, candidates appearing in the All-India Central Services Class I and State Civil Services are examined in at least 3 subjects of Honours standard, besides the compulsory subjects already referred to in the earlier paragraphs. No candidate can offer than two subjects belonging to one discipline. A candidate appearing in these examinations has, therefore, to study two subjects and, in some cases, three subjects of Honours standard of degree course. Since the universities in

the State provide facilities for studies up to Honours standard only in one subject, students who prepare for the competitive examinations have to independently study one or two other subjects up to Honours standard unless they have studied one of these subjects up to post-graduate standard. It will be of advantage to such students, if provision is made for study up to Honours standard in two subjects to be designated as 'Honours course in two combined subjects'. Knowledge of two subjects up to Honours standard and one subject up to post-graduate standard of degree course will also enable students to secure knowledge in breadth as well as in some depth and will be useful in many other areas including teaching in the elementary training colleges and in the higher secondary institutions.

8.69. Honours courses of sufficient depth in one subject with the study of one or two related subjects may be useful for those who want to qualify themselves for working as teachers in the Universities and in the Colleges, particularly in those conducting post-graduate and Honours courses or for taking up research work or for working as scientists in the national laboratories.

8.70. In this connection it is relevant to refer to the recommendations made in the Bihar University Reforms Committee, 1973, according to which a high level special honours course should be introduced in the universities of Bihar. According to the recommendations of that Committee, admission should be on highly 'selective' basis and only those best suited to receive this high level intensive study should be enrolled by the University.

8.71. Candidates who do not want to offer Honours in two combined subjects but are capable of offering honours in one subject may be allowed to do so.

8.72. Those who are not capable of studying honours course should study ordinary pass degree course. Persons with ordinary pass degree course and degree in secondary teachers' training may be required for working as teachers in the secondary schools. Some of them will be able to find employment in junior supervisory positions and as senior assistants under the Government, in industries and commerce and other tertiary sectors. A few persons even with ordinary pass degrees, who secure good marks in the subjects they have studied, may successfully compete even for executive posts under this Government and in Industries, Commerce and other tertiary sectors. Some persons with ordinary pass degree may take up self-employment.

8.73. The Committee accordingly recommends that the following four types of courses in Arts, Science and Commerce (business studies) should be conducted in the undergraduate courses :—

- (i) Special honours course in one subject;
- (ii) Honours course in two combined subjects;
- (iii) Honours course in one subject; and
- (iv) General pass course.

The following combination of subjects may be taught as combination honours subject :—

- (1) Chemistry and Botany.
- (2) Chemistry and Physics (Science of material).

- (3) Classical Studies (Sanskrit or Arabic or Persian) and a Modern Indian Language.
- (4) Computer Science and Mathematics.
- (5) Economics, Accounts and Finance, the details of which have already been discussed earlier.
- (6) Economics and Mathematics.
- (7) Economics and Statistics.
- (8) Economics and Politics.
- (9) Education and Psychology.
- (10) Education and Sociology.
- (11) Education or a Modern Indian Language or History.
- (12) English and a modern Indian Language or a foreign language such as Russian or French or Germany.
- (13) Geograph and Geology.
- (14) Geography and History.
- (15) Geography and regional planning.
- (16) History and Political Science.
- (17) History and Philosophy.
- (18) Modern History and Economics.
- (19) Physics and Mathematics.
- (20) Political Science and Sociology.
- (21) Psychology and Labour and Social Welfare or Personnel Management or Industrial Relations or Sociology or Philosophy.

These combinations are only illustrative and not exhaustive. Some other combinations, depending on their usefulness in any area from the point of job opportunities, may be introduced in the university of that area.

It is not necessary that all the combination honours courses should be taught in all the universities of the State. Each university may provide, on the basis of facilities available and likely to be available and the usefulness of the subjects in different regions, for study of not more than 5 or 6 combination courses.

8.74. The Committee has already emphasised the importance of language, particularly Hindi which is the national language as well as the regional language of the State and English which is not only the associate official language of the Union Government, but also the language in which most of the competitive examinations are held and which is the language of transaction of business of important industries and commercial concerns. In view of this as well as in consideration of the fact that it will take some time before the recommendation of the Committee regarding adequate teaching of languages in the schools is implemented, the committee recommends that in all the courses mentioned above, Hindi (one paper of 100 marks) and English (one paper of 100 marks) should be compulsorily taught.

8.75. In the special honours course, the students will be required to study in depth one subject with another subsidiary subject. This should be a high level course in which the students should study in depth the fundamentals of the subject as well as

the practical aspects. The subject may carry 10 papers with 100 marks each. One of the papers should be an essay paper on topics of contemporary importance. In subjects of practical application, the students may also require to carry on a project assignment which will carry 100 marks. In subjects in which it is not possible to give a project assignment, there may be one or two papers of dissertation. The students taking up a special honours course should study a related subject of three papers each with 100 marks. Thus a candidate studying special honours course will have to study and be examined in the following papers below :—

SPECIAL HONOURS SUBJECT.

(i) 10 papers each of 100 marks (one of the papers will be an essay paper and the other will be a project assignment/dissertation).	1,000
(ii) Another subsidiary 3 papers each of 100 marks	300
(iii) Hindi or any other modern Indian Language—One paper	100
(iv) English—One paper	100
	Total 1,500

A student studying, at present, honours course in one subject has to study and is examined in all in 13 papers in two years. Study of 15 papers as suggested in three years will not, therefore, entail a heavy burden on a student.

8.76. Since the special honours course will be a high level course and will need teachers of real competence, this course should be conducted by the universities under their direct supervision and not in any college.

8.77. *Honours in two combined subjects or one subject.*—A student studying for honours degree in two subjects should be required to study and be examined in five papers in each of the honours subjects. One of these papers should be an essay paper. In addition, he should study another subject of three papers each of 100 marks. Thus a student studying for honours degree in two subjects will have to study and be examined in 15 papers as noted below :—

HONOURS IN TWO SUBJECTS.

(i) 10 papers each of 100 marks (one paper of each of the honours subject will be an essay paper carrying 100 marks).	1,000
(ii) A subsidiary subject of three papers each of 100 marks	300
(iii) Hindi or any other Indian Language—one paper	100
(iv) English—one paper	100
	Total 1,500

The combined two subjects honours course should also be conducted by the University under their direct supervision and not in any college. These will be new courses and care has to be taken from the beginning to see that they become high level courses.

8.78. A student studying for honours degree in one subject should study and be examined in 5 papers. One of these papers should be an essay paper. In addition, he should study two subsidiary subjects of three papers each with 100 marks in each papers. Thus a student studying for honours in one subject will have to study and will be examined in the following papers :

(i) Honours in one subject with 5 papers (one of the paper should be an essay paper).	600
(ii) Two subsidiary subjects 3 papers each of 100 marks	600
(iii) Hindi or any other modern Indian language—one paper.	100
(iv) English—one paper	100
	<hr/> Total 1,400 <hr/>

Honours in one subject should be conducted in the colleges under the direct control of the University and those affiliated colleges which have adequate facilities and teachers of competence.

8.79. A student studying the general pass degree course will be required to study and will be examined in the following papers :—

(i) 3 subjects of 3 papers each (each paper carrying 100 marks)	900
(ii) Hindi or any other modern Indian language—one paper	100
(iii) English—one paper	100
	<hr/> Total 1,100 <hr/>

8.80. The arrangements of courses of studies and marks suggested in the preceding paragraphs will be applicable to courses for Bachelor of Arts, Bachelor of Commerce and Bachelor of Science degrees, but, excepting for the courses of studies in Mathematics. 1/3rd of marks in each science subject will be reserved for practical examinations and the remaining 2/3rds for theoretical examination. The two language papers will be compulsory even for those who study for B. Sc. and B. Com. degrees. Study of languages is important even for those who study sciences, particularly for those who want to appear in the competitive examinations.

8.81. The courses of studies we have recommended for the degree examinations in Arts, Commerce and Science are not heavy for the 3-year degree course. It is,

however, necessary that the students are not asked to appear in all the papers only at the end of the 3 year period. Students should be examined by the University at the end of each of the three academic sessions in some papers so that the load is evenly distributed throughout the three sessions. The scheme of examination at the end of each academic session should be related to the courses covered in that session or/and the preceding session.

8.82. Curricula of different disciplines for degree and in designing post-degree courses of studies for different subjects there is choice between (a) depth and breadth, (b) compulsory subjects and elective subjects, and (c) abundance of the programmes of studies and paucity of the programmes. There has been explosion of knowledge in recent years, especially in Sciences. Knowledge discovered in Sciences from 1950 onwards is more than that during the entire period before that. When knowledge has advanced so much there is a tendency to add new knowledge from year to year to the courses of studies. There are already complaints that courses of studies, particularly in Social Science and science subjects are already heavy. In the circumstances, there is difficulty in planning courses of studies which satisfy the criteria of both depth and breadth.

8.83. Whether courses of studies of a subject should be planned for knowledge in depth or/and breadth should depend upon the aim with which the courses are planned. If the aim is to prepare specialists in particular subjects it will be necessary to design the courses of studies which impart knowledge in depth.

8.84. As already discussed, one of the aims of the proposed special honours courses and Master's Degree Courses is to train specialists for teaching and research work in the Universities and colleges. The contents of these courses should provide knowledge in depth. The contents of the general Honours courses have to be designed with the aim of imparting knowledge of the subjects covered by the Honours courses in moderate depth. The contents of the ordinary degree pass course and subsidiary subjects offered by the students of Honours courses, should be drawn up mainly with the aim of imparting knowledge in breadth.

8.85. *Compulsory and optional subjects.*—Suggestions have been made that there should be greater flexibility in permitting students to offer different combinations of subjects for their studies. Education Commission (1964—66) recommended that the combinations of subjects permissible for the first degree should be more elastic than at present both in the Arts and Sciences and it should not be linked rigidly to the subjects studied in schools. Since the traditional frontiers within subjects particularly relating to social sciences and sciences are breaking down there is some advantage in giving some latitude in permitting the students to study different combination of subjects. At the same time it has to be noted that there is also advantage in inter disciplinary approach in combination of subjects to be studied by the students. It will be advantageous for students who take up Economics to study another subject like Mathematics, Political Science, Psychology rather than study literature. It has also been noted that it is not possible for students to study subjects like Mathematics, Physics, and Chemistry in undergraduate courses unless they have studied them in higher secondary courses.

8.86. The Committee recommends that, subject to the need for inter disciplinary approach to study of different subjects regarding study of a subject and the requirement at the higher secondary courses as a pre-condition for the study of that subject in the undergraduate courses, it should be possible to permit greater flexibility in combination of subjects. In this connection, the committee understands that difficulties have

been experienced by the Universities of the State in recruiting teachers for Econometrics, which is a modern and growing branch of Economics. Recent advances in Economics have increasingly emphasised the role of Mathematics. The Committee recommends that arrangements should be made for the teaching of Econometrics as an elective subjects in the special and general Honours degree courses and Master's degree courses in Economics in the universities of the State and only those who have passed the higher secondary examination with Mathematics and offered Mathematics as a subsidiary subject in the undergraduate course should be allowed to take up this elective course. Students studying for honours degree in Economics should be encouraged to offer Mathematics or Statistics as a subsidiary subject.

8.87. In designing the courses of studies of many subjects in our universities emphasis is still placed on the traditional concept of university as a dispenser of "pure" knowledge rather than practical or vocational knowledge. The traditional concept of the university that it should only impart "pure" knowledge in a subject and should have no concern with the practical application is no longer relevant even in the countries in which it originated. In a developing country and in a State like Bihar in which as pointed out in the previous chapters, education should be related to the economic and social needs, the socio economic compulsions require that the universities cannot dissociate themselves with the environment and socio-economic problems and it is, therefore, necessary that applied knowledge should receive due emphasis and consideration in the courses of studies of a subject. As already mentioned the curricula of even a subject like Commerce or 'Business studies' which is mainly concerned with applied knowledge needs to be re-oriented in the Universities of the State, so as to make them more job oriented. In planning the courses of studies of Bihar subjects also, particularly social sciences and science subjects, the Universities have to look beyond the ivory towers and have to be in touch with the markets in which their products will find employment. The courses of studies of different subjects, particularly those relating to social science and science subjects, apart from incorporating conceptual knowledge have to emphasise the practical aspects and operational skills of the knowledge. Care has, however, to be taken to see that there is correct balance between the two and while it is necessary to emphasise the practical aspects, conceptual knowledge should not be neglected.

8.88. There is demand, particularly from the students that the courses of studies should be relevant to the social environment and in which they will have to work and to the life they will have to lead on completion of their studies. Incorporation of up-to-date knowledge and adequate emphasis on practical aspects and operational skill of a subject will satisfy, to a large extent, the criteria of relevance. Relevance of courses of studies should not, however, be at the cost of conceptual knowledge. In the study of any discipline the core principles of conceptual knowledge must be adequately emphasised. Apart from the fact that conceptual knowledge will discipline the mind, it will also be necessary from the point of view of jobs, because in the competitive examinations candidates are asked questions on conceptual knowledge and fundamentals as well as on practical aspects. Those students who propose to take up teaching work in the colleges and the universities and research work will have to make deeper studies of the fundamentals. There should, therefore, be adequate emphasis on the fundamental and conceptual knowledge in the special Honours course.

8.89. *Humanities*.—Even in the studies of the humanities, there is need for emphasis on practical aspects. Practical aspects of the study of language should enable a person to gain understanding and command over the language and to marshal and to express his ideas logically and properly. The committee has recommended compulsory study of two languages Hindi or any other modern language and English in

undergraduate courses with a view to enabling the students to develop skill of language so that they are able to understand the language well and express themselves properly. Those who want to study language and literature of Hindi or any other modern language or English or any other foreign language can offer that subject as an optional subject for undergraduate courses. Skill in oral and written expressions of a language has to be imparted by various means like debates drama, dialogues, essay writing, etc. and, to the extent possible by means of lessons on radio and use of language laboratories.

8.90. *Social Sciences*.—There have been many changes in Social Sciences in recent times. Social Sciences have become technical in the sense that present methods such as statistics and other methods are heavily used in teaching and research in Sociology, Social Psychology, Economics and other Social Sciences. Recent development in this respect should be incorporated in the syllabus of Social Sciences, particularly those for Honours degree. Social Sciences have also become increasingly specialised. It is necessary that in Social Sciences the students should develop understanding of the core principles of the discipline they choose to study. It is in the field of Social Sciences that the demand of the students for relevance of their studies to social environment is more pressing. A student studying a Social Science should be required to study the core principles of the discipline. After he has studied the core principles, the students should be required to study the practical aspects and implications of the core principles of discipline he has studied. If it becomes necessary to study the practical aspects of a discipline in the field, provision for this should be made in the curriculum and arrangements; should be made for such study in the field. For example, provision should be made for the students of the discipline of labour and social welfare or personnel management and industrial relations, to study the practical application of the principles of these disciplines to these workers working in factories, banks, business concerns, etc. Similarly students of 'Commerce' or 'business studies', should study the working of industrial and business concerns. Even if a person is not able to secure a paid job on completion of his studies, knowledge of applied aspects and operational skills of the knowledge has acquired well at least convey to him the relevance of his studies to the economic and social activities of the community.

8.91. *Curriculum for Science degree courses*.—As in other disciplines, there is demand for making science courses more practical and thereby oriented towards profession and jobs which students will have to take up on completion of their studies. There is also a demand for making it more relevant to the environment. Although there are good reasons for devoting adequate time to the contemporary problems in Science, there are equally good reasons for incorporating in the curricula fundamentals of Science and Scientific knowledge in adequate measure. Courses in Science should be so restructured as to incorporate the fundamentals which are necessary for acquiring knowledge of the disciplines which the students has chosen to study and also applied knowledge and skills which prepare the students for careers in Science or Science based professions. There should be adequate emphasis on work in the laboratories and, wherever so required, in the field.

In designing the courses for science subjects, interdisciplinary approaches have to be adequately emphasised, specially in view of the fact that basic courses in different sciences are often overlapping.

Besides modernization of curricula and stress on laboratory and field work, it is also necessary, as recommended by Education Commission (1964—66), to develop workshops and facilities for servicing, repair and fabrication of scientific apparatus and the training of technicians. Students should be enabled to learn the use of workshop tools and equipment and get acquainted with some of the essential laboratory

techniques and practices such as making projection slides, soldering, welding, electrical wiring and general maintenance and repair of mechanical and electrical equipment used in laboratories.

The use of science and technology in increasing productivity in different branches of economy and increasing the net domestic product should be emphasised.

8.92. In designing the curricula of the degree and post-graduate degree courses of different disciplines, with a view to making them job-oriented those who plan the courses have to keep in view one of the important objectives of higher education, namely, "Instruction in skills suitable to play a part in the general division of labour". They have to satisfy themselves that along with the criteria of "advancement of learning" and "promotion of general power of mind" the courses will be of some practical use to the students.

8.93. We have already suggested that in designing the courses for Commerce or 'Business studies', those who have qualified themselves as chartered accountants and cost and works accountants and have experience of working in Industries and Business should be associated. Similarly in designing the courses of studies of other disciplines persons having experience of practical aspects of knowledge of the relevant disciplines should also be associated. Since job-oriented education implies that the universities and educational institutions should keep in view the needs of the different sectors of economy and the society they have to keep in touch with the markets of their products. The first contact with the market should be the association of those who will employ the products of the universities in designing the courses of studies.

8.94. It will be necessary for at least some of the teachers of the courses of studies designed on the lines indicated above to have knowledge of practical aspects and operational skill of the relevant disciplines. It is no use designing courses of studies incorporating applied knowledge without teachers who possess such knowledge to teach them. It will be worthwhile employing some persons engaged in Industry and Business and even Public Administration as part-time teachers. Efforts may be made to recruit as teachers, at least, some persons with good academic records with some experience of practical aspects of the relevant disciplines. If necessary, some teachers may be seconded to government departments, industries and business for specified periods to acquire experience of practical aspects of their disciplines.

8.95. Whenever curricula are revised there is tendency to add new knowledge to them without subtracting any old knowledge with the result that over the years curricula become heavy. The committee recommends that, instead of marginal appraisal of courses and revisions, radical review of the courses of studies of different disciplines should be undertaken by the universities of the State on the line indicated in foregoing paragraphs. In this revision those courses which have become obsolete and irrelevant should be needed out and new knowledge and courses which are relevant should be added.

8.96. It is not enough only to radically revise, wherever necessary, the courses of studies. It is also necessary that adequate facilities in respect of teaching and hostel accommodation, laboratories, equipment, libraries, reading rooms, play fields etc., are available. It is no use incorporating the applied aspects and operational skills of the disciplines and engage competent teachers to teach them without the laboratory equipment and other facilities necessary for imparting practical

aspects and operational skills of knowledge. There are many universities and colleges in the State which have no adequate facilities for satisfactory teachings and in many institutions the Laboratory and equipment are old and obsolete. Advances in knowledge especially in sciences require suitable and new equipment. These have to be provided. If and when courses of studies are revised on the line indicated above the facilities, especially in respect of laboratories and equipment and libraries required for teaching those courses of studies should be indicated. A survey should be conducted by the University to ascertain which of the departments and the colleges have these facilities and deficiencies, if any, indicated by the survey should be removed.

8.97. Some students study only those combinations of subjects for degree courses which they consider easy for passing examinations. Such combinations, however, do not necessarily help them in securing jobs. For example, students of pass courses who study subjects which are not taught in schools may find that there will be difficulty for them in getting jobs of teachers in secondary schools. The combinations of subjects to be taught in different classes should be such as to help the students in preparing themselves for employment including self-employment which are available in the social and economic activities of the State and the country.

8.98. *Courses of Master's degree in Arts, Science and Commerce.*—According to the existing regulations, students studying for Master's degree have to study and are required to be examined in eight papers. It is necessary that the courses of studies for Master's degree should be such as to enable the students to study in depth the subjects concerned. One of these papers in the subject included in the disciplines of humanities and social sciences should be an essay paper. Preparations for essay paper enable a student to develop the habit of independent study in depth as well as in breadth, of marshalling his thoughts in a systematic and logical manner and expressing them in suitable language. As have been mentioned earlier, candidates who want to appear at the competitive examinations have to invariably write an essay which carries 100 to 150 marks. Many questions included in the papers set in the examinations require essay type answers. From the point of view of job-opportunities it is, therefore desirable that the students of Honours and post-graduate courses should be required to study for and be examined in writing an essay of 100 marks on a subject preferably of contemporary importance.

8.99. We have already recommended earlier that special honours and combined honours course should be conducted by the universities themselves. Post-graduate courses are at present conducted by the universities as well in a few colleges, which also conduct intermediate and under-graduate courses. The numbers of students in under-graduate classes is at large that the college authorities are not able to pay close attention to post-graduate courses. The Committee recommends that the post-graduate courses and special honours courses should be conducted by the universities as separate units under their direct supervision and they should be separated from the under-graduate courses.

8.100. *Post-graduate courses.*—The courses for post-graduate study should also have a balance of fundamental knowledge and applied knowledge.

8.101. *Combination of subject at the post-graduate level.*—Education Commission (1964—66) suggested that, in addition to the one subject course for Master's degree, combination courses consisting of say, one major subject and one or two

subsidiary and related subjects should be provided. It is felt that the objective which the Commission had in view can be secured by providing larger number of elective papers of related subjects in each discipline at the post-graduate level. Study of the main subject together with elective papers of the related subject(s) will be helpful to the students who want to appear at the competitive examination in which knowledge, at advanced levels, in two or three subjects is required. It will also be possible for persons who have studied a main subject together with elective papers of related subjects to bring upon different subjects inter-disciplinary approach. The Committee recommends that in the courses of studies of each major discipline two or three elective papers of each of the related subjects should be available for the students who want to study them in the lines indicated below :—

- (i) In the courses of Master's degree in Indian language and literature, provision should be made for study of 2 or 3 elective papers of another Indian language and literature or of a foreign language and literature.
- (ii) In the courses of studies for Master's degree in History, provision should be made for the study of 2 or 3 elective papers in Political Science or Geography or History or history of Science or history of Economic thought.
- (iii) In courses of studies for Master's degree in Geography, provision should be made for the study of 2 or 3 elective papers in History or Geology or Meteorology or Astronomy or Economics.
- (iv) In the courses of studies for Master's degree in Labour and Social Welfare, provision should be made for the study of 2 or 3 elective papers in Psychology or Sociology or Economics.
- (v) In the courses of studies for Master's degree in Mathematics, provision should be made for the study of 2 or 3 elective subjects in Economics or Physics or Statistics.
- (vi) In courses of studies for Master's degree in Economics, provision should be made for the study of 2 or 3 elective papers in Mathematics or Political Science or Statistics or History or Labour and Social Welfare.
- (vii) In the courses of studies of Master's degree in Philosophy, provision should be made for the study of 2 or 3 elective papers of Psychology.
- (viii) In courses of studies for Master's degree in Botany, provision should be made for the study of 2 to 3 elective subjects in Zoology or Chemistry or forestry including utilisation of timber.
- (ix) In courses of studies for Master's degree in Chemistry, Provision should be made for the study of 2 or 3 elective papers in Mathematics. Physics or Botany or Chemistry.
- (x) In courses of studies for Master's degree in Anthropology, provision should be made for the study of the 2 or 3 elective subjects in Sociology or History or Psychology.

These are only illustrative; there is a wider range of elective papers of related subjects, provision of study of which can be made along with the study of a major subject depending upon availability of teaching staff, equipment and other facilities.

8.102. In the courses of studies drawn up for the degree and post-graduate courses for various subjects there are no indications regarding the hours/periods in which they are to be covered. In the present circumstances the numbers of hours or periods available for effective teaching are much fewer than those required for completing the courses with the result that complaints are received from the students that full-courses are not covered before they are asked to appear at degree or post-degree examinations. When the courses of studies are drawn up the hours/periods within which the prescribed courses of studies can and should be completed, should be indicated and all efforts should be made to conduct effective teaching for the prescribed hours/periods. A teacher's first and primary responsibility is to teach the students and to be available to guide them to clarify the points and doubts raised by them and if the students so desire be also available for consultation with regard to their personal problems. The teachers who want to carry on research work should do so not at the cost of teaching the students, but during hours when they are free from their teaching work. Whole-time research fellows should be engaged for research work approved by the University on topics sponsored by Government Industries and Business and if need arises separate institutes like A.N.S. Institute for Social Studies may be set up for research work in different disciplines.

8.103. In the beginning of each academic session each teacher should draw up a plan for teaching indicating different areas of courses of studies to be covered in each quarter and submit the plan of teaching to the head of the department. After the approval of the plan by the head of the department, the students should also be informed about it and teaching should be conducted according to the plan. The head of the department should review and discuss the progress of teaching with the teachers of department every quarter. Deficiency in teaching, on account of any unforeseen reasons should be made up in the following quarters.

8.104. *Short-term course to be conducted by the University.*—Universities and the colleges should conduct short-term courses in various areas for those who are already working in Government industries, business and other relevant fields. Faculty for conducting such courses should be drawn from not only the university and college teachers but also from those with practical experience in the relevant area. Such an arrangement will not only benefit the persons working in the Government Industries, Business and Agriculture but will also familiarise the teachers of the universities and the colleges with the practical problems relating to their disciplines.

8.105. *Research work and Research degrees.*—Mention has already been earlier in this chapter that many teachers work for and obtain Research degrees not because they are genuinely interested in research work but in order to get advance increments in their schemes and this has led to the deterioration in the quality of research work. Such persons prepare their thesis without adequate preparation and without fully understanding the methodology of research. As suggested by the University Grants Commission, it is desirable to introduce research-cum-post-graduate degrees like M. Litt. and M. Phil. and allow only those who obtain such degrees to prepare for Doctorate Degrees like Ph.D., D.Litt., and D. Sc. The Committee recommends that course-cum-research degrees of M.Litt. and M.Phil. should be introduced in the universities without delay. Those who register themselves for these courses should be required to study advanced courses including methodology of research and contents of the subjects in depth and also to do research work. The course contents may be of four papers of 100 marks each and research thesis may carry 400 marks. The

duration of the courses should be of 2 years. Preference should be given in registration for these courses to those who have graduated with honours degrees and obtained good Master's degrees with at least 50 per cent marks or secured, at least Grade. After these courses are introduced and persons with M. Litt. and M. Phil degrees are available, persons who have uniformly good academic records and obtained M. Litt. and M. Phil. degree should be given preference in appointment to the posts of teachers in the departments of universities and in the colleges.

8.106. Research work in the universities is not conducted on any planned basis and there is no adequate emphasis on purposeful or/and problem oriented research. Many research workers exercise soft options and, select, in consultation with their teacher guides, topics of research which are convenient from point of view of availability of materials and on which guidance can be provided easily by the teachers who agree to work as their guides. From the point of view of job-oriented education, it will be desirable to place adequate emphasis on researches which are problem oriented, production oriented and which can make contributions to increase in productivity and expansion and development of economic and social activities. While research workers should be free to select the topics on which they want to carry on research work with a view to extending the frontiers of knowledge of the subject-matters they select, the universities, in collaboration with the Government and industries and business organisations, may promote research work on the lines suggested above. Different departments of the State Government may select topics and problems on which they want research work to be done and send them to the universities. The universities should also contact public and private sector, industrial and business undertakings with a view to obtaining topics and problems relating to production, productivity and development. Universities may draw up lists of topics they receive from the Government and industrial and business undertakings and make them available to the teachers of the concerned departments and faculties. The Departments or faculties which want to do research work on any of these topics should be given adequate facilities to do so. The State Government and the industrial and business undertakings should make available to the universities adequate funds and fellowships required for research work on the topics suggested by them and selected by the universities and the research workers.

8.107. The Committee would like to caution here that research work, whether for extending frontiers of knowledge or with the utilitarian objectives, should not be conducted in the universities at the cost of teaching in the undergraduate and post-graduate classes. The Committee has argued at length that, unless undergraduate and post-graduate education in different disciplines is of high quality, there will be difficulties for persons with degrees and post degrees from the universities of the State to compete for jobs in the State and the country which are available. The teachers of the colleges and the universities have to give first and the most important priority to the quality of teaching in the undergraduate and the post-graduate classes in which they teach.

8.108. We have repeatedly emphasised in the foregoing paragraphs that job-oriented higher education has to be of good quality to enable the products of the universities and the colleges of the State to compete for jobs under the Central and the State Governments, public and private sector, industrial and commercial undertakings and even for self-employment. We have also emphasised that the courses of studies of different subjects should contain not only knowledge about the fundamentals as also about practical aspects and operational skills of the subjects concerned and should be relevant to the environment in which the students will have to work after completing their education. The research work which has some practical use and which the university wants to promote on the basis of the problems and topics sponsored by the Government, Industries and Business should be carried on under the guidance of senior selected teachers by whole-time fellows who should be given adequate amount of fellowship.

8.109. In considering school education and vocational education it has already been mentioned that the most important factor which can lead to improvement in the quality of education is the quality of teachers. This conclusion holds good in the case of universities and college teachers also. One of the primary reasons for deterioration in the quality of higher education in recent times is the non-availability of teachers of competence in many universities and colleges. Complaints have been made that some teachers even among those who are competent do not take interest in teaching work. Now that the pay-scales of the teachers of universities and colleges are comparable with those of the higher central services, it will be possible to attract a fair proportion of good talents of the country to teaching profession. It is essential that only those who are competent in their subjects should be recruited as teachers, in the universities and the colleges. Any persons with uniformly good academic records should be recruited as teachers. Only those who have secured not less than 55 per cent marks or Grade 'good' 'very good' in all the examinations commencing from the Secondary School Examination Certificate up to the Master Degree should be considered to have uniformly good academic records.

8.110. It is also necessary to improve the competence and upgrade the skills of those teachers of universities and colleges whose competence and skills need improvement. One way in which this can be done is to allow the new improved scales of pay to only the teachers of competence. The teachers who possess research degrees or who possess uniformly good academic records in the examinations and who take interest in teaching may be given the new improved scales of pay. Those who have not received less than 55 per cent marks or grade "good/very good" in all their examinations commencing from the School Secondary Examination Certificate up to Master's Degree Examination should be entitled to the new scales of pay. In other cases only those who obtain intermediate research degree like M. Litt. or M. Phil. in which they will have not only to prepare thesis but also to undergo prescribed courses of studies in depth should be entitled to new scales of pay. Study in depth of advanced courses and preparation of thesis for M. Litt or M. Phil. degree may be expected to improve the academic calibre of the teachers already in position

8.111. It is also necessary to motivate the teachers so that they take greater interest in teaching. One of the conditions for introduction of the new scales of pay is that the teachers will not get separate remuneration for evaluation and assessment of examination papers. Another condition is that the teacher must remain in the Department of Universities/Colleges in which they have worked for fixed hours even when they have no classes, so that the students who want to consult them should be able to do so within those hours. It will be necessary to enforce these conditions and devise sanctions for enforcing them.

8.112. In every important organisation there is provision for assessment and evaluation of the performance of that organisation. Even in the Government Departments performance budgeting has been introduced and financial expenditure sanctioned for completion of any assignment is measured against the physical targets and other targets to be achieved. It is desirable that in each University and in each college there should be a system of evaluation of performance. The University should itself carry out review of performance of different departments and the results of its performance should be made available to the Syndicate and Senate of the University as also to the Government and placed before the Legislature.

8.113. Similarly, each college should be asked to submit an annual report about its performance and the university inspectors should periodically evaluate the performance of each college and submit their reports to the Universities. These reports should be placed before the Syndicate and the Senate of the University, and also sent to the Government.

8.114. *Personality tests and importance of co-curricular activities.*—In the foregoing paragraphs we have considered mainly the academic side of education including course of studies, method of teaching and examinations and evaluations. As already mentioned even for recruitment to the services for which competitive examinations are held the candidates qualifying in the written examination, have to appear in viva-voce tests. The viva-voce test may carry marks ranging from 10 per cent of the marks in the written examinations as prescribed for recruitment to the State Services to 50 per cent marks as prescribed for recruitment to the commissioned rank for Armed Forces. In recruitment to positions in some public undertakings and to many posts under the Government and to most of the positions in the private sector, undertakings performance in the interview is the main criterion.

8.115. Viva-voce tests or interviews are conducted with a view to assessing the personality of the candidates, their alertness, their powers of expressions, etc. Job-oriented higher education should also aim at development of the personality of the students, improving their oral and written expressions and generally developing their power of mind. The universities and the colleges have, therefore, to involve themselves also in co-curricular activities which contribute to these aims and objectives. In order to enable students to participate in co-curricular activities including debates, drama, sports and recreational activities, participation in the National Cadet Corps and social service schemes, arrangements have to be made for accommodation of a large number of students in hostels. The existing arrangements for accommodation of the students in hostels are wholly inadequate and many students have to reside under conditions which are not at all conducive to development of personality and studies in congenial atmosphere.

8.116. Facilities for co-curricular activities are inadequate in the universities and most of the colleges and few teachers take interest in them. Students Unions also seldom take interest in these activities. In fact, the students Unions are more concerned with activities other than academic and co-curricular. Some portions of the funds of the Unions together with adequate matching funds from the university and college concerned are earmarked for different co-curricular activities and joint committee of teachers and students are set up for promoting co-curricular activities in each college and university.

8.117. *Careers in the Army.*—We have already referred to the appropriate combinations of courses of studies in the higher secondary education and usefulness of participation in the N.C.C. for enabling the students to compete for recruitment to the commissioned rank of the Armed Forces. In addition to the competitive examination held for admission to the National Defence Academy and Indian Naval Academy graduates with 'C' certificate in N.C.C. are also recruited to the commissioned rank of Armed Forces on the basis of the results of interview by Service Selection Board. Selections are also made of degree-holders and post-graduates to the educational and administrative branches of the Armed Forces on the basis of the results of viva-voce tests by the Services Selection Board. Recruitment to the commissioned rank of the Technical Branches like Engineering Corps, Medical, Dental and Veterinary Corps is also made from among the degree-holders on the basis of interview by the Service Selection Board.

8.118. Since the marks in the viva-voce tests lasting for a number of days form 50 per cent of total marks of the written and viva-voce tests for selection for admission to the National Defence Academy, Indian Military Academy and Indian Navy and interviews and personality tests conducted over a number of days form the basis for recruitment to other branches for which a degree or post-degree in relevant branches is the minimum qualification, those who do well in personality tests are more likely to be selected for the commissioned rank of various branches of the Armed Forces. In

some of the States, specific institutes have been established by enterprising persons or bodies for helping the candidates in viva-voce tests or interview by the Service Selection Boards. Personality cannot be developed in a short period; development of personality depends upon many factors including the environment at home, at schools, colleges and universities, etc. However, appropriate training and guidance, even for a short period can help the candidates to face the tests or interviews by the Service Selection Board more confidently. The N.C.C. organisation located at Patna has made some arrangements for helping the students who are members of the N.C.C. to prepare themselves for viva-voce tests and interviews conducted by the Service Selection Boards. It is necessary that these arrangements should be improved and training programmes should be conducted by the N.C.C. Officers and with the help of Army Officers, wherever available, for a larger numbers of students in the State. For the time being such training centres can be established in the cities and towns in which the headquarters of the universities are located.

8.119. *Large-scale unemployment among degree-holders.*—As mentioned in paragraph 1.13 in chapter I of the report, the numbers of unemployment among the graduates and undergraduates have been increasing over years. The numbers of undergraduates and graduates borne on the Live Registers of Employment Exchanges in 1961 were 4,120 and 3,233 respectively. In 1973, they increased to 1,36,630 and 1,04,923 respectively allowing for the fact that a number of candidates got themselves registered in more than one employment exchanges in 1973. The sharp increase in the numbers of unemployed under-graduates and graduates indicates that the quantum and quality of university and college education particularly in Arts, Science and Commerce are altogether incompatible with the economic and social activities of the State.

8.120. Taking the index for the educated job-seekers in Bihar and India in 1966 as 100 (the base index), the index of educated job-seekers in 1972 was 482 as against 357 for all-India. The following categorywise distribution of educated job-seekers in India and Bihar brings out that, while in the categories of undergraduates in the proportion of unemployed persons in Bihar is lower than that of all-India, the proportion of graduate unemployed persons in Bihar is higher than that in all-India.

Categorywise distribution of job-seekers : India and Bihar.

(Figures in '000)

JOB-SEEKERS.

Year.	All-India Bihar.	Matricula- tes.	Inter/Under- Graduates.	Graduates.	Total.
1	2	3	4	5	6
1966..	All-India ..	619.0 (67.50)	204.0 (22.25)	94.0 (10.25)	917.0 (100.00)
	Bihar ..	43.4 (64.78)	9.7 (14.48)	13.6 (20.30)	67.0 (100.00)
1969..	All-India ..	910.0 (59.60)	401.0 (26.30)	215.0 (14.10)	1,526.0 (100.00)
	Bihar ..	75.0 (57.25)	28.7 (22.00)	27.3 (20.80)	131.0 (100.00)
1972..	All-India ..	1,745.0 (53.23)	932.0 (28.43)	601.0 (18.34)	3,278.0 (100.00)
	Bihar ..	188.6 (58.40)	68.8 (21.20)	66.0 (20.40)	323.0 (100.00)

8.121. The fact that the index of job-seekers in Bihar has increased from 100 in 1966 to 482 in 1972 in Bihar as compared with 357 during the same period for all-India, indicates that (i) the numbers of educated persons have been increasing in Bihar in proportions higher than the proportion of increase in the economic and social activities of the State as compared with that all-India and (ii) and that the educated persons from Bihar have not been able to get adequate shares in jobs under the Central Government public and private sector undertakings also partly indicate that graduates from Bihar are not able to compete in adequate numbers in all-India Service, services under the Central Government and Central and Private undertakings.

8.122. In order that higher education may conform to the likely pattern of employment opportunities, it is necessary to relate enrolments in the institutions of higher education to the broad patterns of requirements of man-power and at the same time improve the quality of the degree holders and post-degree holders to compete in all-India and Central Services as well as for positions under Public and Private undertakings. Recommendations for improving the quality of education with this objective have already been made. While it is necessary that the tempo of economic and social activities should increase, it has to be appreciated that this increase is dependent to a large extent on availability of funds for investment in these activities.

8.123. It needs to be repeated that re-arrangements of courses, however sound, cannot create jobs which have to be created by economic and social activities. We have to recognise the fact that while the improvement in the courses of studies and teaching will to some extent improve the chances of students to secure jobs under the Central and the State Governments and under various industrial and commercial organisations as discussed in earlier paragraphs and improvement in quality of education may enable students to understand their environment better and may be useful in self-employment, it will not solve the problems of large numbers of undergraduates and graduates who are unemployed and who will come out of the universities and college every year.

8.124. If young people, after attending colleges for years and securing degrees are not able to get paid employment and are not fit to take up self-employment, it implies that the economic and social returns from investment in higher education are very low. Provisions made for higher education in the budget of the State for 1975-76 amounts to about 15 per cent of the total budget on education. Higher education is highly subsidised. Persons belonging to the advantaged classes receive proportionately greater benefits of the subsidy on higher education. Since the quality of education imparted in most of the colleges and the universities is low, it does not even lead to the fulfilment of objectives like "advancement of learning", "promoting power of mind" and "transmission of common culture of citizenship" besides the objective of training for "instruction in skill in the division of labour" as mentioned in Robbin's Committee on higher education. Higher education imparted to most of the students who do not fit in the economic and social activities of the State thus becomes costly irrelevance".

8.125. In the circumstances, it is essential, as observed in the document relating to approach to the Fifth Plan, that this problem should be tackled not only from the demand side but also from the supply side. The Committee, therefore, reiterates that its earlier recommendation that further growth of college should be stopped by legislation, if necessary, should be implemented without delay and that any new college of Arts, Science and Commerce, or in any other discipline should be established only on

the basis of genuine need and according to a plan. This planning must be done jointly by the Government and the Universities.

8.126. It is also necessary that there should be an adequate machinery at the State level for the planning of man-power requirements and a machinery under the State under the State Education Department for planning higher education in response to the man-power needs. It is unfortunate that even after about 25 years of planning there are no reliable data indicating the needs of man-power of various social and economic activities of the State. There should be a cell for man-power planning under the Development Commissioner, who co-ordinates and oversees the planning of economic and social activities by different departments of the State Governments. There are no doubt difficulties, as pointed out in an earlier chapter of the report, in making accurate forecast of man-power requirements over a reasonably long period. However with a suitable machinery there should be no difficulty in making approximate forecast regarding man-power requirements. If these forecasts are periodically reviewed, and changes, wherever necessary, are made, it should be possible to plan man-power requirements for different sectors on a reasonable basis. The Committee recommends that the State Government should set up without delay a cell for this purpose under the Development Commissioner.

8.127. The position in respect of the planning of Secondary and higher education is equally unsatisfactory. There is virtually no planning for Secondary and higher education in the State. Secondary schools and colleges have been and are set up by individuals in an unplanned manner without taking into consideration whether there is need for the persons educated and to be educated in these schools and colleges, whether the persons who will come out with the certificates and degrees from the schools and colleges will get employment or whether they are employable, and whether there are adequate facilities of teaching accommodation, hostel accommodation, libraries, laboratories, equipment and teachers for imparting satisfactory level of education in these schools and once these schools and colleges are set up, pressures are brought on the Board of Secondary Education and the Universities for recognition and affiliation of these institutions and on the Government for sanctioning funds for payment to the teachers. The main objective of the establishment of such schools and colleges is to provide employment to unemployed graduates and post-graduates and to create a platform for those who want to gain prominence in political and social fields. Employment of a few for turning out large numbers of young people who are unemployable and who will remain unemployed results in huge wastage of efforts and scarce resources, and creates frustration amongst young people and leads to social tensions.

8.128. The planning of higher education should be done on State level jointly by the State Government and the Universities. The State Government and the Universities should jointly plan the establishment of colleges and introduction of new subjects and the courses of studies on the basis of man-power requirements. This plan should be prepared for five years and should coincide with Five-Year Plan of the State Government. Each University should prepare, within overall plan at the State level, its own Five-Year Plan for the facilities to be provided in teaching departments and the affiliated colleges. A Committee consisting of Education Minister as Chairman, Development Commissioner, Education Commissioner, Financial Commissioner, Industrial Development Commissioner, Health Commissioner and the Vice-Chancellors of all the universities should be set up for the planning of higher education at the State level.

8.129. In a totally planned economy, the planning of education including higher education is a part of the overall economic and social planning, and facilities for higher education are created and provided in response to the economic and social needs. In a society which has adopted total planning there is no question of massive unemployment of persons with higher education. Even if there is a temporary surplus of educated and trained persons in such an economy at a particular point of time, steps are taken to correct the imbalance.

8.130. In countries with advanced economy which have not adopted planning, students study different branches of higher education or professional courses with the expectation, on the basis of information and guidance available to them, to qualify themselves for jobs with particular ranges of incomes and salaries. In our country and in our State large numbers of students enrol themselves in colleges mainly because they have nothing else to do and only a few students of better calibre have some ideas about what they are going to do after completion of their education. No information and guidance are available to most of them about the employment opportunities and the relevance of the courses of studies they choose for their degrees and post-graduate degrees to the employment opportunities which are available.

8.131. There is, at present, an Information Bureau in each University, which is supposed to advise the students on the employment potentials of different courses of studies. This Bureau is looked after by a senior teacher of the University in addition to his own work. This arrangement has not proved to be satisfactory and useful to the students. The teachers who are in charge of these Bureaux in the Universities are themselves not fully aware of the employment potentials of various courses of studies because there is no adequate machinery in the State to guide them with the information required and they themselves are not in close touch with the employing organisations and their requirements. In fact, it is not possible for one teacher of the University to provide information about employment potentials of all courses of studies in the Universities and the jobs available in the different economic and social activities of the State. The Committee has recommended that, in designing the courses of studies of subjects which have practical application in various fields, those associated with the practical application in the relevant fields should be associated. The Committee has also recommended that persons having academic background as well as experience of practical application of the relevant subjects should be invited to teach the students and the teachers of the Universities should be sponsored to acquire knowledge of the practical application of the relevant subjects in industries, business, administration, etc. Suggestions have also been made at appropriate places for the practical training of the students in the fields in which practical training is necessary. If, as recommended by the Committee, the man-power cell under the Development Commissioner can collect man-power needs, it may make relevant information available to the Universities. If these recommendations are implemented, it should be possible for the University and teachers to have an idea about the employment potentials of different courses of study and advise students about them. It will be useful to the students if each University and college can maintain, at a central place, information and particulars regarding employment potentials of various courses of studies, the method of recruitment to various employment positions, the particulars of the examinations, if any, to be held for recruitment, the facilities which the Government make available for self-employment and such related information. It will be desirable to maintain all such information and relevant literature in a wing of the library of the University and the college itself. The Librarian or an Assistant Librarian should also be able to advise the students about literature on employment

opportunities and about the persons and the organisations to be contacted for information and particulars about employment opportunities. Some Universities of the State have now appointed Deans of Students' Welfare; other Universities may be expected to follow suit and have Deans of Students' Welfare. These Deans of Students' Welfare also should have copies of all literature regarding job-opportunities for the students of different disciplines. They should also be able to advise the students on selection of courses of studies from the point of view of job-opportunities.

8.132. From the point of view of job-oriented education it will be useful to associate the employers of the products of the Universities in the Syndicate (Executive Council and the Senate) of the Universities. Apart from the representatives of the Government, representatives of the Industry and Commerce (including Public Sector undertakings) should be included in the Syndicate and the Senate of a University.

8.133. *Non-viable institutions.*—Large numbers of the colleges are non-viable and they have neither adequate facilities in respect of accommodation (teaching and hostel), laboratory, equipment, library, play-field, etc., nor competent staff and adequate numbers of students. The quality of education imparted in such colleges is low. Such colleges only add to the problems of turning out persons many of whom are unemployable or/and cannot be absorbed in the existing economic and social activities and who, therefore, become frustrated. In the words of Education Commission (1964—66). "No country, affluent or poor, can afford to squander its resources on institutions which are indifferent in quality and determined to remain stagnant. When resources are scarce and problems formidable, the principles of concentration and selectivity becomes all the more imperative". No satisfactory education can be imparted in such ill-staffed, ill-equipped institutions. The concept of job-oriented education imply elimination of such institutions. The State Government themselves are aware of this problem and have constituted a Committee to examine this matter. It will be desirable to draw up a plan according to which colleges which cannot become viable within a reasonable period of 2-3 years should be amalgamated with other colleges which are viable or 2 or 3 non-viable can be combined into a viable college. This work deserves high priority.

8.134. In almost all the colleges of the State, provision is made for the teaching of the traditional subjects of the humanities, social sciences and natural sciences irrespective of the considerations whether persons obtaining degrees in these traditional subjects will be able to find employment in the areas in which the institutions are located or elsewhere in the State or the country. As has been brought out in the discussions in this section of the report, the job-opportunities available for degree-holders, especially in the traditional subjects are extremely limited and only the top students can compete for the limited numbers of the higher jobs which are available. A few with uniformly good academic records and good post-graduate degree can become University and College teachers. A few degree-holders can expect to get the limited numbers of supervisory posts and posts of senior assistant under the Government and industries and tertiary sectors available to degree-holders or become school teachers. The remaining degree-holders who remain unemployed try to secure clerical jobs for which they are over qualified and which are also limited in numbers. It is, therefore, necessary that in planning establishment of the colleges and higher institutions, the Committee appointed by the State Government and mentioned in paragraph 8.119 should also consider the subjects and disciplines to be taught in these institutions, especially in those which

are to be newly established in response to the needs for manpower and higher education in any particular area.

8.135. One of the reasons for craze for higher education is the disparity between the emoluments of various levels of workers, employees and professional people. Whereas the lowest paid unskilled worker of the unorganised sector of economy of the State does not get Rs. 2.50 or Rs. 3 a day (although the minimum fixed by law is Rs. 4.50 a day), the salary of the highest paid officer of the State is Rs. 3,500 a month. In comparison with the income of the lowest paid worker and self-employed person in unorganised sector, the emoluments of even the middle level employees working under the Government, and in industries and tertiary sectors are high. The emoluments of the highest paid managers in private sectors are still higher. However, the emoluments of the lowest paid workers in the organised industrial tertiary sectors are also high. The additional income from private practice of a medical graduate is very often more than his salary and the earnings of a senior medical expert may sometimes be many times of his salary. This is one of the reasons why there is rush for admission in the medical colleges and, as already mentioned, some of the medical colleges charge very high capitation fees for admissions. At the same time the health and medical care services available in the rural areas are very inadequate. The Committee has made some recommendations for training of medical auxiliaries and para-medical personnel to augment the inadequate services available in the rural areas. Apart from the provision of the training facilities of such personnel it is also necessary that the high degree of disparity between the incomes of different levels of medical personnel should be reduced. It is also necessary that disparity of the emoluments and income between the lowest paid workers, the semi-skilled workers, the skilled workers, the technicians and the professional persons and the equivalent categories working under the Government and other sectors of economy should be reduced.

Jobs under the Government, in Industry and Commerce should be properly evaluated within the range of the minimum and the maximum salaries. The differences between the minimum and the maximum salary should be reasonable and in conformity with the principle of economic and social justice.

8.136. Apart from the fact that many students join the institutions for higher education because they have nothing else to do, some enrol themselves in these institutions because of the amount of dowry a degree of the university is likely to fetch in marriages. In spite of the fact that large number of degree-holders remain unemployed, parents attach value to degrees in settling marriages and the amount of dowry is very often linked with the types of degrees. There is need for social reform and strict implementation of laws regarding offer to dowry to prevent craze for higher education in those who are not capable of pursuing it seriously.

8.137. The most effective method of discouraging those who are not capable of receiving higher education and benefiting by it is to recruit to lower posts only those who possess the minimum qualification and the specific vocational or commercial certificate or diplomas required for the job. The recommendation of the Committee in this respect made in paragraph 4.96 of the report should be implemented on a priority basis.

8.138. Apart from the checking of unplanned growth of colleges and amalgamation of the non-viable colleges with viable colleges, it is also necessary to regulate

admissions to under-graduate courses on 'Selective' basis. Enrolment in the colleges of persons who are not fit to receive higher education leads to not only wastage of scarce resources but also creates problems of discipline. Those who have not the capacity to receive higher education and profit by it, do not find interest in academic work in the colleges and are, therefore, more likely to indulge in indiscipline. It will, therefore, be in the interest of higher education as well as in the larger interests of the society to restrict admission to the colleges only to those who can really profit by higher education. The Committee recommends that only those who secure 45 per cent marks in the aggregate whose overall achievement can be graded as grade 5 or satisfactory should be admitted to the colleges. If persons belonging to the Scheduled Castes or Scheduled Tribes fail to secure admissions to the extent warranted by proportion of their population to the total population of the State on the basis of this criterion, students belonging to these communities who have secured 35 per cent marks or who are just below 'satisfactory' may be admitted to the extent required for making up the deficiencies in the numbers of admissions warranted by proportion of the Scheduled Castes/Tribes to the total population.

8.139. It is also necessary that the special honours courses and the general honours in one and two subjects should be conducted in only those colleges which have adequate facilities for conducting them. As recommended by the Bihar University Reforms Committee, special honours course should be conducted by the University Departments and not in any college. Teachers of higher calibre should teach the students of special honours and post-graduate courses. Honours courses in two subjects should be conducted only in those constituent colleges which have adequate facilities in respect of accommodation (class room accommodation and hostel accommodation, libraries, teachers' libraries and equipment). Honours in one subject may be conducted by these constituent colleges as well as some of the good affiliated colleges which have adequate resources in all respects for teaching up to honours standard.

8.140. In order to improve the quality of education in the special honours courses and those in two subjects, and one subject, admission to these courses should be made on 'Selective basis' on merit. The Committee recommends that admission to special honours course should be confined to those who have secured at least 50 per cent marks or grade 4 (good) in the aggregate in the higher secondary examinations and the subjects which they want to study for the special honours. Similarly, those who want to take up honours in two or one subject should have secured at least 45 per cent marks or grade 5 (satisfactory) in the aggregate and 50 per cent marks or grade 4 in the subjects in which they want to take up honours. Relaxation to the extent of 5 per cent marks may be made in the cases of the candidates belonging to the Scheduled Castes and Scheduled Tribes.

8.141. *Economic development and development of Education.*—It should be appreciated that the level of the educational and cultural development of a society is very largely determined by its economic development and the necessary social economic and political conditions should exist for education to develop. Economic development is however, linked with and depends upon the educational level and skill of the people and productivity of those engaged in economic and social activities. There is need for qualified skilled personnel, technicians and specialists in different branches of knowledge for the programmes of economic development which may be taken up in the State and the country. It is, however, not possible to achieve high level of education for masses or even for an appreciable sections of the population unless the economy of the country and the State is developed.

8.142. As has been mentioned in an earlier chapter of the report, the rate of economic development of the State has been very slow and with this rate of economic development it is very difficult to sustain higher education for large numbers of persons who cannot be absorbed in the economy and who will remain unemployed. The first priority, therefore, has to be given to the programmes of economic development and educate and train workmen, technicians, specialists, including technologists, scientists and humanites required for these programmes of development. Priority has also to be given to education which can help in modernising the society and create conditions and atmosphere for economic development. Development of selected institutions of higher education and 'selective' admission based on the requirements of economy are, therefore, in the social interests. Even the advanced countries including the U. S. S. R., the U. K. and many other countries of Europe have been following the policy of admission to the universities and the institutions of higher education on 'selective' basis whereas more than 50 per cent of the students who are successful in the Secondary Examination of the State enrol themselves in the colleges in the State, not more than 15 per cent and 20 per cent of the school leavers join institutions of higher education in most of these countries. However, it has to be ensured that, subject to the relaxation suggested in the case of the candidates belonging to the Scheduled Castes and Scheduled Tribes, admission to the higher institutions should be made purely on merit. Sons and daughters of poor parents who show promise of development in the school should be enabled, by scholarships on liberal scales, to study in the best schools so that they may get equality of opportunity for competing with the children of parents with better means for admission to the institutions of higher education. Once they get admission in higher education, their education should be supported by scholarships, stipend, etc.

8.143. It needs to be repeated here that the policy of containing enrolment so as to conform to the likely pattern and quantum of employment and adopting a system of enrolment on 'selective' basis should not imply that those who are not able to enrol themselves for higher education should be denied higher education for all time. Persons who miss higher education and enter economic activities as paid or self-employed persons should have the opportunities to improve their qualifications and upgrade their skills through part-time education or education through correspondence course. Not only higher education but even secondary and primary education in the State is either wholly or predominantly formal and little consideration has been given to the important role of informal education in a developing country like ours. It is necessary to make satisfactory provision for courses of studies for higher education through correspondence in the universities of the State and also to provide for facilities for part-time education in important cities for those who have to work during day time. Education through correspondence course and part-time courses will also cost less and pose fewer administrative and social problems. We shall discuss later the details of the education to be imparted through correspondence course by the universities.

CHAPTER IX

ENGINEERING EDUCATION—DEGREE AND POST-DEGREE COURSES

9.1. The following degree courses in Engineering are conducted in the six Engineering Colleges located in the State. The numbers of admissions in 1972-73 in each course are noted against each institution :—

	Civil Engg.	Mech. Engg.	Elect. Engg.	Prod. Engg.	Tele. Commu. Engg.	Chem. Engg.	Meta. Engg.	Total.
1	2	3	4	5	6	7	8	9
B.I.T., Sindri ..	45	60	50	16	15	40	30	256
M.I.T., Muzaffarpur ..	40	20	30	..	..	..	..	90
College of Engineering, Bhagalpur.	30	20	35	..	..	..	..	85
B.I.T., Mesra ..	30	90	35	25	30	..	..	210
Bihar College of Engineer- ing, Patna.	45	20	30	..	..	..	..	95
B.I.T., Jamshedpur ..	45	60	45	..	..	..	30	180
Total ..	235	270	225	41	45	40	60	916

The intake capacity of these institutions is much larger. For example, the total intake capacity of per annum of B.I.T., Sindri is 390 as against 256 admissions in 1972-73, that of Muzaffarpur Institute of Technology is 120 as against 90 admissions in 1972-73, and that of Engineering Colleges, Bhagalpur is 120 as against 35 admitted in 1972-73. The numbers of admissions have been reduced in view of unemployment of Engineers particularly in the category of Civil, Mechanical and Electrical Engineers.

In addition, Indian School of Mines which is an All-India Institution conducts courses in Mining Engineering, Petroleum and Applied Geology. It is an All-India institution and the number of students from Bihar admitted to this institution is quite low in proportion to the mining sector and production of minerals which account for nearly 39 per cent of the total production of minerals in the country.

9.2. 3,888 graduates in various branches of Engineering whose names were borne on the Live-Registers of Employment Exchanges on 19th January 1973 as noted below :—

Civil	...	...	...	...	1,075
Mechanical	...	...	...	...	1,281
Electrical	...	...	...	...	950
Chemical	...	...	...	...	234
Metallurgical	...	...	...	...	284
Mining	...	...	...	...	25
Others	...	...	...	...	39

Total : 3,888.

9.3. The figures show that, in view of large numbers of unemployed civil, mechanical, electrical engineers, there is no scope, for the present, for increasing the number of admissions in these courses to an extent which will have impact on diverting higher secondary school leavers to these courses. In view of unemployment of the engineering graduates of these categories, the number of admissions to these courses have temporarily been reduced below the maximum intake capacity in the engineering institutes of the State. Although the numbers of unemployed chemical and metallurgical engineers are comparatively smaller, the existing developments in the fields of chemical and metallurgical engineering may not justify increase by any appreciable margin in the number of admissions. However, if the proposals for coal-based fertilizer factory and petro-chemical complex materialise in the State, there will be need for more chemical engineers and consequently justification for increase in the number of admissions to chemical engineering course.

9.4. (a) Civil Engineers are mostly employed by the Public Works, Public Health Engineering and Irrigation Departments in the State. With the slowing down of the pace of construction the demand for Civil Engineers in these departments has gone down. Construction work in the civil engineering, public health engineering and irrigation departments is done largely through contractors. Small contractors generally do not employ engineers for doing construction work. There are only a few big firms which employ Civil Engineers for construction work. As most of such firms have their headquarters in places outside the State they recruit engineers from all over India. Unemployed graduate engineers have been offered incentives and facilities for taking up construction work, but only a few engineers have taken advantage of these incentives and even among those who come forward to take up construction work on contract many have withdrawn from this work. This may be indicative of lack of entrepreneurship among them, want of self-confidence and aversion to hard practical work.

(b) Mechanical Engineers are mostly employed in organisations doing planning, layout, and design of factories, and construction and erection, and in maintenance of equipment in factories and in the field and in production work in factories.

(c) Electrical Engineers are employed in appreciable numbers by Bihar State Electricity Board for generation, transmission of power, planning, layout, maintenance and design of equipment and electrical installations. Some Electrical Engineers are employed by the State Government and the Central Government. Some Electrical Engineers are also employed in the planning, lay out, design, construction and erection of factories as also in maintenance and operation of electrical equipment in the factories.

(d) Chemical Engineers are employed mostly on planning, layout design, and operation of chemical factories.

(e) Metallurgical Engineers are mostly employed in operation and various processes of metallurgical factories and quality control and inspection of the products of such factories. A few are employed in planning, lay out and design of metallurgical factories.

(f) All categories of these engineers are employed as teachers in Engineering Colleges and Polytechnics.

(g) Engineers with specialisation in general management, industrial engineering and operations research, production control, inventory control, sales, etc., are employed in the area of their specialisation in industries, commercial concerns, etc.

9.5. It will appear that, while a large proportion of the Civil and Electrical Engineers find employment within the State under the Works Departments and State Electricity Board respectively. Mechanical, Chemical and Metallurgical Engineers are largely employed in public and private sector undertakings including small-scale industries. Some of them are also employed in the organisations set up for the planning and preparing lay out of factories and the design of equipment. Some Electrical Engineers and a few Civil Engineers are also employed in such organisations and in the factories in public sectors and private sectors.

9.6. Recruitment to the managerial and supervisory positions for which Engineering degree is the minimum qualification is made on all-India basis by the public sector undertakings as well as by the bigger and important private sector undertakings. Recruitment of managerial and supervisory personnel by medium size and even many small undertakings is generally made at their headquarters which are often outside the State.

9.7. Employment position of engineering graduates coming out from the engineering and technological colleges of the State can improve to some extent, if the engineers from the State are able to compete, on merit, for various positions under the Central Government and public and private sectors recruitment to which is made on all-India basis. Significant improvement in employment position can, however, be brought about mainly by encouraging Mechanical, Electrical, Metallurgical and Chemical Engineers to take up self-employment in small-scale industries, and Civil Engineers take up construction work. References have already been made in the earlier chapters to the fact that the growth of large-scale public sector undertakings in the State has not been accompanied by corresponding growth of small-scale ancillary and subsidiary industries. As mentioned earlier, the State Government have undertaken programmes for development of areas near the large industrial complexes in the State for intensive development of small-scale industries. Various types of incentives are offered to the unemployed educated persons, especially, engineers for taking up self-employment in small-scale industries. These have not however, been able to attract adequate number of engineers to self-employment in small-scale industries. One of the reasons for this may be the lack of quality of entrepreneurship and practical experience.

9.8. Employers in the public and private sectors mentioned before the Committee that, while the top students of the Engineering Colleges in Bihar are able to compete with the products of other Engineering Institutions in the country including the Indian Institute of Technology, others who obtain their degrees from Engineering Colleges of Bihar broadly suffer from the following deficiencies :—

(i) They have no clear concepts of the fundamentals of the subjects they have studied. They give the impressions in the interviews that they have not tried to understand the fundamentals, but have concentrated on 'selective' study with a view to passing the examinations. They also show lack of knowledge of application of the theories they have studied.

(ii) They have difficulties in expressing themselves properly in English and even in Hindi or mixture of Hindi and English.

- (iii) They show lack of general knowledge, and knowledge of their environments.
- (iv) The high marks awarded for sessional and practical work by the college and university authorities highly exaggerate the ability and performance of the students and go to show that assessment of the students work in the Engineering colleges is not fair and objective.
- (v) Most of the Engineering graduates, if appointed, show lack of confidence, particularly in respect of skill of communications and try to avoid work on the shop floors which require dealing with human beings and prefer soft options by trying to work in design, sales, stores, purchase etc.
- (vi) Most of them do not appear to have taken any interest in co-curricular/extra curricular activities which develop initiative, team work as well as personality of the participants in these activities. Organisation of and participation in games, excursions, exhibitions, dramas, seminars and similar other activities also develop the qualities of leadership among the students.

9.9. It is necessary that steps should be taken to remove the deficiencies and improve the quality of Engineering education in the Engineering Institutions of Bihar in order to enable the Engineering graduates of those institutions to successfully compete for various positions in the public and private sectors and also to enable them to acquire self-confidence, knowledge and entrepreneurial spirit to take up self-employment.

The least that the Engineering Institution should be able to do is to impart the knowledge of fundamentals and their application to the students. Some of the teachers of the engineering colleges mentioned before the Committee that one of the reasons why some of the students are not able to grasp the fundamentals of the subjects they study is that the students of low calibre including even those who secure 10 to 15 per cent marks in the competitive examination held for admission are admitted in Engineering Institutions. While this may be true in respect of some students who are admitted in spite of low marks in the competitive examination there is no reason why students with higher mark in admission test show ignorance of fundamentals and their application as mentioned by the employers. Employers mention that, as between the Engineering Institutions in the State, the products of two of the Engineering Institutions of the State are better than those of others. Since admission to at least one of these two is made on the basis of test common to all the engineering colleges under the State Government, it can safely be inferred that other factors including the quality of teachers, methods of teaching and evaluations are also partly responsible for these deficiencies. The best products of the Engineering colleges are not being attracted to the teaching profession in Engineering Colleges. Even those who accept the position of teachers do not, very often, have the experience of industry and knowledge of application of fundamentals to the industrial problems. Promotion of teachers is made on the basis of seniority and not on the basis of merit and work with the result that meritorious teachers seek their advancement outside Engineering Institutions.

9.10. While it is necessary that those who secure low marks in the test held for admission to the Engineering Institutions and are incapable of providing by higher

education should not be admitted in the Engineering Institutions, it is equally necessary that teachers of competence should be appointed in the Engineering Institutions and they should be given the incentive of promotion based on merit which should include experience of practical aspects of engineering and publications of research work and hard work instead of only on basis of seniority. It is also necessary that the teachers of engineering colleges should be given opportunities to gain experience in industry. The Committee recommends that arrangements should be made to depute young teachers to industries during vacations or, if necessary, even for longer periods. Senior teachers should also be in touch with the industries and visit industries at suitable intervals to gain practical knowledge of new equipment that might be in use and the new processes which might have been developed.

9.11. Visits to industries and observational tours which are very often used for sight-seeing should be more purposeful and more intensive. Instead of visiting a number of places and a number of industries within a few days, it will be desirable to make intensive study of one or two industries over a period of 15 days to 30 days. The teachers having knowledge of the application of theories to the processes in the industries visited as well as the engineers and technologists engaged in industries should explain to the students the application of the theories to the problems of operation, maintenance, design, etc. Complaints have been made that the students of engineering colleges which are situated next door to the industries do not have even the elementary knowledge of the products of those industries and the processes employed in them. It should not be at all difficult for the institutions situated in proximity of these industries to arrange for visit of students to those industries and make purposeful study, in collaboration with the engineers and technologists, of the application of fundamentals of the engineering and technology.

9.12. Engineers have to act as Supervisors and Managers who require skill in language for communication with the people above them, below them and with their peers. The Committee has already referred to the low level of teaching of English in the schools and made recommendations for its improvement. Since engineering education is imparted and will continue to be imparted for some years through the medium of English, it is essential that the quality of the teaching of English should improve in schools and in the Higher Secondary stage as recommended by the Committee. At the same time, steps should be taken to prepare standard books and literature relating to Engineering and Technology in Hindi so that Hindi may be adopted as medium of instructions in Engineering Colleges in due course. This may, however, take some years. In the meantime, in order to enable the engineering graduates of the State to compete for jobs in the public sector and private sector undertakings, it is necessary that the students should have adequate knowledge of English so that they can understand the fundamentals of that subject taught through the medium of English, express themselves satisfactorily before the Selection Committee interviewing them and write notes and reports in that language for their superior officers. At the same time they should also possess good knowledge of Hindi for proper communication at different levels.

Since the knowledge of English language imparted in school and at intermediate classes is not adequate, it is necessary that the students of the engineering classes should be taught English for, at least first 2 years of the engineering course. Teaching of English should not only be formal through the medium of books but also through conversation and through other well-known media. If tutorials are held regularly and students are asked to present written materials and these materials are discussed

with their active participation in the tutorials, they will be able to improve their knowledge of the language. Presentation of papers and preparation of project reports will also enable the students to improve their knowledge of the language.

9.13. The suggestions made regarding purposeful visits to industries and imparting practical experience to the teachers of the engineering colleges in industries as well as talks and visits by engineers and technologists from industry and engineering institutions should enable the students to know their environment better and enable them to acquire knowledge of the application of the theories. Satisfactory arrangements and practical training in industries will also be helpful. Arrangements regarding practical training in industries have been discussed in latter paragraph of this section.

9.14. We have discussed the methods of teaching and assessment and evaluation separately and our recommendations in this respect are applicable to engineering course also. The sessional and practical work are important part of engineering courses and they should continue but their assessment must be fair and objective. If the marks or grades allotted for sessional and practical work show that they are much higher than the marks obtained in the corresponding theoretical papers, there are adequate reasons to scale down those marks on basis of an objective system of scaling. It is recommended that in order to ensure a fair and objective assessment which can be accepted as fair and reliable by the employers, a system of scaling down, wherever necessary, should be adopted.

9.15. Social education including skill in communication should form an important part of engineering education. The work of an engineer very much concerns human beings and is related to social and economic problems and development. It is, therefore, necessary that the engineers should understand social and economic environment so that they should be able to communicate with the human materials and motivate them. Even now a student of engineering courses has to study one of the following social science subjects for his degree and post-degree:—

- (a) Psychology,
- (b) Economics,
- (c) Modern History,
- (d) Political Science, and
- (e) Community Development.

Study of only one of these subjects by a student for his engineering degree does not cover all aspects of social education which is necessary for an engineer or a technologist. In Engineering Degree Course, there is need for inclusion in courses of studies for social education for engineers, of the study of man in relation to productive processes, basic principles of economics of production, the need for increasing productivity for raising the standard of living, elements of cost and the need for keeping cost of production as low as possible, commitment to the social and economic goals and ideals, etc. In place of the traditional course in social science now included in the courses of studies for engineering degrees, courses on social education should include and emphasise these aspects. It may be necessary to prepare suitable textbooks incorporating these aspects.

9.16. So far as the practical training is concerned, emphasis should be placed on adequate workshop practice and sessional work. The deficiencies in respect of

qualified and experienced instructors for imparting training in workshop practice in the Polytechnics of the State referred to in paragraph 4.80, Chapter 4 exist in the engineering colleges also. It is essential that qualified and experienced instructors preferably having experience in industries should be available in the workshops. Other recommendations made in Chapter 4 regarding imparting training in workshop practice in Polytechnics are applicable to the training in workshop practice in the colleges also.

9.17. It is also necessary that practical training in works and factories should be made compulsory for all the engineering graduates. Practical training should be arranged during vacations. Complaints have been made that industries and other concerns in which practical training has to be arranged do not fully co-operate in such arrangements. Industrial undertakings find difficulties in providing places for practical training for all the students of the engineering colleges of the State and colleges from outside the State who seek facilities for such practical training.

9.17-A. Foundation for co-curricular activities is laid in the school. The Committee has already emphasised the importance of co-curricular activities in the school. The co-curricular activities including organisation of and participation in games, excursions, seminars, exhibitions, debates, dramas and other cultural activities should continue in the colleges including the engineering colleges. What is required of an engineer today is not only technical competence, but also his knowledge and understanding of social environments and development of integrated personality so that he can view the technical and industrial problems in proper perspective. Most of the engineering colleges provide for residential accommodation and facilities for extra co-curricular activities. These should be strengthened and teaching staff should, while participating in these activities, try to encourage the students to take initiative in organisation of these activities.

Recommendations made in paragraphs 4.79, 4.82, 4.83, 4.84, 4.85, 4.86 in Chapter 4 regarding practical training and workshop practice made in respect of students of the Engineering Polytechnics should be applicable to practical training and workshop practice of the students of the engineering colleges also.

9.18. Some selected engineers working in the Public Workers, Public Health Engineering and Irrigation Departments and Bihar State Electricity Board should be deputed to teach in the engineering colleges and some selected teachers of the engineering colleges should be temporarily deputed to these departments to gain practical experience.

9.19. It would have been desirable to introduce sandwich courses in those Engineering Institutions of the State in which it is possible to organise them. There are, however, practical difficulties in organising sandwich courses in the engineering colleges of the State. The numbers of industries which can provide facilities for practical training in sandwich courses are small. Many of them are situated at some distances from the engineering colleges and there is difficulty in providing accommodation for large number of students. However, arrangements for conducting sandwich courses in Metallurgical Engineering in Sindri can be made in collaboration with Bokaro Steel Plant. Similarly, the proposed mining engineering course to be introduced in Bihar Institute of Technology, Sindri can be conducted on sandwich basis in co-operation with the mines of Bharat Coking Coal Ltd., and National Coal Development Corporation. It should also be possible to conduct electrical engineering

course at Sindri on sandwich basis in collaboration with the D. V. C. and Bihar State Electricity Board.

9.20. In view of the considerable numbers of unemployed engineers, there is no scope for increasing, by any large margin, number of admissions in the existing branches of engineering. There is, however, some scope for introducing the following new courses the products of which are in demand or are likely to be in demand in the near future :—

- (a) *Agricultural Engineering Course.*—With the increasing modernisation of agriculture, power-driven agricultural equipment including tractors, pumps, sprayers, etc., are being and will be increasingly used in the State. Although there may be no need for an exclusive course in agricultural engineering, at present there is sufficient scope for introducing agricultural engineering as an elective subject. In view of the fact that predominance of agriculture in the region of North Bihar, agricultural engineering may be introduced as an elective course in Muzaffarpur Institute of Technology, Muzaffarpur. With greater modernisation of agriculture and improved agricultural equipment it may later become necessary to introduce a regular full course of agricultural engineering in that institute. This institute should collaborate with the College of Agriculture, Dholi and Rajendra Agricultural University both of which are located not far from it in conducting this course.
- (b) *Ceramic and Refractory Engineering Course.*—Although, there is a sizeable refractory industry in the State, there is no provision of refractory engineering. A degree course in ceramic and refractory engineering with 15 admissions every year may be introduced in B. I. T., Sindri.
- (c) *Coal Technology.*—With the increasing use of coal as the most important source of energy in the country the requirements for coal technologists will increase in the country. For the present, a post-graduate diploma course in coal technology may be introduced in B. I. T., Sindri which conducts a degree course in chemical engineering.
- (d) *Electronics and Tele-communication.*—In view of their increasing use and importance these should be introduced as an elective course at degree level in all the engineering colleges of the State. Post-graduate courses in these branches are available in B. I. T., Mesra and B. I. T., Sindri.
- (e) *Food Processing and Food Technology.*—This subject should be introduced as an elective course in chemical engineering course at the degree level. It should also be introduced as an elective course at a degree level in the colleges of agriculture under Rajendra Agriculture University.
- (f) *Industrial Management Course.*—A Post-Graduate Course in Industrial Management may be introduced in B. I. T., Sindri. This course should be available to those engineers who have experience of at least 3 years in industries. This course should provide training in different branches of management and industries including planning and layout, production control, inventory control, human relations, financial control, etc. The courses should be conducted by the practising managers as well as the teaching staff of the institute.

- (g) *Industrial Engineering*.—A Post-Graduate Degree Course in Industrial Engineering should be introduced at B. I. T., Sindri which is already conducting a degree course in production engineering.
- (h) *Instrumentation and Control*.—A Post-Graduate Degree Course leading to M.Sc. degree in instrumentation and control should be introduced in B.I.T., Sindri.
- (i) *Leather Technology*.—The numbers of cattle in the State are very large and hides and skin of cattle are sent out from the State in large quantities. A large number of people including many belonging to the Scheduled Castes are engaged in the processing of hides and skins and manufacture of leather goods. The technology adopted by them is, however, very crude. There are only a few concerns which have adopted improved technology; there is considerable scope for application of new and improved technology in processing hides and skins and manufacture of leather goods. It is desirable to introduce a course in leather technology preferably in M.I.T., Muzaffarpur.
- (j) *Mining Engineering Course*.—The Committee has already recommended in Chapter 4 of its interim report introduction of a mining engineering course with 30 admissions every year in Bihar Institute of Technology, Sindri. In view of its proximity to coal-mines, the course to be conducted at B.I.T., Sindri in mining should be a sandwich course. As already mentioned by the Committee the mining engineering course conducted at the Indian School of Mines, Dhanbad is open to the students from all over India and large number of students from Bihar desirous of studying courses in mining engineering are not able to secure admission in this Institute. There are States with comparatively much smaller mining sectors than Bihar, conduct courses, in mining engineering in their engineering institutions. In view of the plans for large-scale development of coal-mining and existence of a very large mining sector in the State, there is full justification for conducting a degree course in mining engineering in B.I.T., Sindri.
- (k) *Minor Irrigation and Rural Engineering*.—These should be introduced as elective subjects at the degree level in the engineering colleges of the State.
- (l) *Textile Technology*.—There is considerable scope for development of Textile Industry in the State. There are proposals for setting up some textile mills in the State. There is need for modernising the handloom sectors by introduction of powerlooms. There will be need for Textile Technologists in the State. A Degree Course in Textile Technology may be introduced in Bihar College of Engineering and Bhagalpur College of Engineering.

9.21. *Research on and development of small industries for employment of engineering graduates*.—Mention has already been made earlier that the development of small-scale industries in the State has been slow and has lagged behind the development of major and medium industries in the State. One of the reasons for this, as already mentioned, is lack of entrepreneurship. Another important reason for this is the lack of necessary financial support and support from the major and medium scale industries. Birla Institute of Technology, Mesra (Ranchi) has been maintaining an

Industrial Research Department. This Research Department, in collaboration with another organisation known as Small Industries Research and Development Organisation has established central testing facilities and has been maintaining market data to help entrepreneurs among the new graduates who want to take up self-employment in industry. It has been helping the entrepreneurs in obtaining financial assistance from the banks. It has also been giving them technical guidance and developing indigenous equipment, particularly in the field of electronic equipment for industrial purposes as part of the import substitution programmes and making available to the entrepreneurs the technical knowhow of the equipment. With the help of the Industrial Research Department of Birla Institute of Technology and Small Industries Research and Development Organisation a number of Engineering graduates have been able to set up their own small-scale industries and have been supplying requirements of public sector and other industries.

9.22. It should be possible to organise similar industrial research and development wings in other Engineering Colleges for development of small-scale industries in areas near those colleges and encourage engineering graduates who want to take up self-employment in small-scale industries with the assistance of the type given by Industrial Research Department of Birla Institute of Technology and Small Industries Research and Developmental Organisation. Regional Institute of Technology, Jamshedpur is situated in an area in which major, medium and small-scale industries have been established in large number. Bihar Institute of Technology, Sindri is situated in an area in which mining and chemical industries as well as medium and small-scale industries have been established. If research and developmental organisations on the lines set up by the Birla Institute of Technology are set up in these two institutes they will be of help not only to the engineering graduates who want self-employment in industries but also in solving the problems of the small-scale industries of the areas near these institutes. Similarly, the research and developmental organisations, if located in Bihar College of Engineering, Patna, can help the engineering graduates graduating from the college in taking up self-employment. Muzaffarpur Institute of Technology, Muzaffarpur and College of Engineering, Bhagalpur are situated in agricultural areas. Agriculturists have now been using in increasing number modern agricultural equipment like tractors, pumps, sprayers, threshing machine, etc. If Research and Development Organisations are set up in these two colleges they can look after not only the problems of small-scale industries, and, particularly those engaged in manufacturing agricultural equipment, but may also help some engineering graduates coming out from these colleges in taking up small-scale industries manufacturing these and other equipments.

9.23. The Committee recommends that a small committee consisting of teachers of B.I.T., Sindri, R.I.T., Jamshedpur, M.I.T., Muzaffarpur and College of Engineering, Bhagalpur who are interested in research and development, the representatives of the Industries Department and Agriculture Department and a representative each of the Research and Development Department of Birla Institute of Technology, Mesra (Ranchi) and Small Industries Research and Development Organisation, Mesra (Ranchi) may be set up for identifying the areas in which the research and development organisations, if set up in these colleges, can be of use to the small-scale industries of the areas served by these colleges and to the engineering graduates coming out from these colleges who want to set up their own industries.

9.24. *Education and training for personnel required for coal-mining industry in the State.*—In Chapter IV of Volume I of the Report the Committee made the following recommendations :—

- (i) Industrial training institutes with facilities for training in trades relevant to the coal-mining industry should be set up in Bermo-Bokaro area in Giridih district and Karanpura area in Hazaribagh district.

- (ii) A Mining Engineering Polytechnic for training not only in mining engineering and mining survey but also for diploma in electrical and mechanical engineering suited to the requirements of mining industries should be set up.

Recommendations also were made that these institutions should also be utilised for giving part-time education and training to persons already engaged in mining and industry who meant to upgrade their qualifications.

- (iii) A Degree Course in Mining Engineering should be introduced in Bihar Institute of Technology, Sindri, and this course should be conducted on a sandwich basis.

9.25. Since these recommendations had been made the Committee has had the benefit of detailed discussions with the authorities of Bharat Coking Coal Ltd., and National Coal Development Corporation and Planning and Development Institute of Coal Mines Authority regarding the requirements of coal industry for various categories of personnel and the arrangements for training them. On the basis of these discussions, the Committee recommends that the arrangements for starting these three courses should be made immediately.

9.26. A statement (Annexure II) indicating the requirements of Managerial and Supervisory Personnel of various categories of National Coal Development Corporation which is the Central Division of Coal Mines Authority will show that a sizeable number of mining engineers as well as mechanical and electrical engineers and personnel for general management will be required by this organisation during the Fifth Five-Year Plan. Bharat Coking Coal Ltd. will also require a number of mining engineers particularly with specialization in use of mechanical equipment in mines, mines surveyors and electrical-mechanical technicians and skilled personnel.

9.27. Another statement (Annexure III) will show the various categories of the non-managerial technical personnel required by N.C.D.C. during the Fifth Plan period. They require about 5,662 personnels of various categories including 339 overmen and about 700 Mining Sirdars. The authorities of the N.C.D.C. are keen that the Polytechnics and the Industrial Training Institutes for training and personnel of various categories required by them during the Fifth Plan period should be established in the mining areas of Bermo, Bokaro and Karanpura. They showed their readiness to co-operate in these courses being run on sandwich basis. They also indicated their willingness to give practical training to the instructors of technical training institutes as also to make available a few of their own men to work as instructors.

9.28. Bharat Coking Coal, Ltd., have programmes for mechanisation of mines and want to retain their existing personnel. They also require fresh trained personnel for some of the categories including those trained as electromax technicians and skilled workers who can repair both electrical and mechanical and mining components of machineries. They also want mining engineers with specialization in mechanization. The Committee recommends that the Directorate, Technical Education of the State Government should immediately get in touch with the training authorities of Bharat Coking Coal and constitute Joint Committees of Engineering College and Technical Institutions and the technical personnel of Bharat Coking Coal for drawing up courses of studies of training programme for training and retraining personnel required by them. Facilities for training and retraining these categories of personnel should be provided in Bihar Institute of Technology, Sindri, Polytechnic, Dhanbad, Mining Institute, Dhanbad and Mining Institute, Bhaga.

CHAPTER X

EDUCATION FOR AGRICULTURE AND ANIMAL HUSBANDRY
AT THE DEGREE AND POST-DEGREE LEVELS

10.1. *Agricultural and Veterinary Science Education at the degree and post-degree levels.*—As already mentioned one Agricultural University, namely, Rajendra Agricultural University has been set up in the State with three Agricultural Colleges, two colleges for Animal Husbandry and Veterinary Science and four Regional Research Training Centres. Agricultural Colleges provide for a 3-year degree course in agriculture and 2-year post-graduate course in various branches of agriculture and veterinary colleges provide for 4-year degree course in Animal Husbandry and Veterinary Science and 2-year post-graduate course in various branches of Veterinary Science and Animal Husbandry. The total intake capacity of colleges of agriculture is about 1,200 and of veterinary colleges about 950 at the under-graduate level and about 200 post-graduate level in Agriculture and 60 in Veterinary Science and Animal Husbandry subjects. With the expansion of agricultural sectors during the Five-Year Plans quite a large number of graduates in Agriculture and Veterinary Sciences and Animal Husbandry were appointed by the State Government for extension work. However, after the initial requirements had been met the annual requirements of these graduates have gone down. In order to prevent unemployment among graduates in these branches the number of annual intakes in the agriculture and veterinary colleges has been reduced as noted below:—

Degree Courses in Agriculture—140 per annum or total intake 320.

Degree Courses in Animal Husbandry—60 per annum or total intake 180.

10.2. Predominance of the large agricultural sector in the economy of the State would have justified a much larger intake in the colleges of Agriculture and Veterinary Sciences and Animal Husbandry. However, since agricultural operations are still largely carried on in the State on the traditional lines, the demand for agricultural technologists and technicians is comparatively much lower than that in the modern sectors of industries and mining.

10.3. The need for modernisation of agriculture has already been emphasised. The Committee has also emphasised the need for various types of training in agriculture for school-leavers, school drop-outs, farmers and their sons and recommended establishment of agricultural polytechnics. Almost all the graduates in agriculture and animal husbandry and veterinary sciences seek employment under the Government. Even those agricultural graduates who possess adequate land do not take up self-employment in agriculture. Apart from the fact that educated persons in the State and the country seek safety in Government jobs, low productivity in agriculture is one of the main reasons for graduates in agriculture not taking up self-employment even when they possess adequate lands. Modernisation of agriculture should be able to attract graduates in agriculture and allied activities to farming. Increasing emphasis on agriculture, irrigation and other infra-structures for agriculture during the fifth and subsequent plans should be able to contribute, in some degree, to modernisation of agriculture.

10.4. With the establishment of agricultural polytechnics there will be need for teachers and training personnel for those polytechnics. As recommended by the Committee, the training programmes to be imparted in those polytechnics will include,

to a considerable extent, practical training. The teachers and the training personnel to be appointed for those polytechnics should have, therefore adequate practical experience.

10.5. Complaints are often made that graduates in agriculture and allied activities do not have adequate practical experience and they are, therefore, not able to provide adequate guidance to the farmers in their fields. Courses for degree in agriculture and veterinary science and animal husbandry do provide for practical training but this practical training is not intensive. Agricultural colleges do not possess land adequate for giving intensive practical training to students in all types of agricultural operations. The Committee understands that there are practical difficulties in acquiring more land for the existing campuses of the agriculture colleges. In the circumstances, alternative and supplementary arrangements for practical training should be made. The Committee recommends that after a candidate completes his course and appears at the final degree in agriculture and veterinary sciences examination he should undergo intensive practical training in one of the farms maintained by Agriculture Department for, at least one year, before he becomes eligible to work as an Extension Officer or a teacher or trainer in a polytechnic. Arrangements may also be made, wherever feasible, for imparting practical training to agricultural graduates on those farms of progressive farmers or on co-operative farms which are in a position to provide such training. Without the development of agriculture which, as repeatedly mentioned, is by far the largest sector of economy providing about 54 per cent of the State's net domestic income and on which about 80 per cent of the population of the State depend, there will be no hope for development in other sectors of economy and consequent increase in employment opportunities for educated persons. It is indeed a paradox that, although agriculture occupies such a prominent place in economy, and needs expansion and development, it cannot absorb even the modest number of graduates in agricultural, veterinary science and animal husbandry for education and training of whom provision exists in the colleges of the State.

10.6. Agriculture will have to be developed and modernised to meet the needs of food for the growing population. Modernisation of agriculture will need agriculture technologists in increasing numbers. Adoption of technology in agriculture will result in increasing productivity which may induce graduates in agriculture who possess land to take up self-employment in agriculture. It should be possible for at least a few agricultural graduates who undergo practical training on the lines suggested in the preceding paragraph to take up farming as a business including raising of seeds of quality which are in high demand.

10.7. Graduates in veterinary sciences and animal husbandry also depend upon the Government to provide jobs. Except in big cities where a few graduates in animal husbandry and veterinary science take up practice, veterinary graduates do not find private practice attractive in the rural areas. Low productivity in agriculture and poverty of the large sections of people engaged in agriculture do not permit them to pay adequate attention to cattle. The prices of draught as well as milk cattle have gone up very high and illness or death of such cattle deprived the farmers of their important means through which they carry on their agricultural operations. With increase in productivity of agriculture the farmers will be anxious to consult graduates in veterinary science and animal husbandry in case of illness of their cattle. Agricultural development will therefore result in corresponding demand for graduates in veterinary science and animal husbandry.

CHAPTER XI

MEDICAL EDUCATION

11.1. Medical Education occupies a very important place in job-oriented education. We have, briefly, referred in Chapter IV, to the recommendations of the Report of the Committee on Medical Education, Bihar (1973) and made recommendations for training of medical auxiliaries and para-medical personnel.

Since the Committee on Medical Education, Bihar, 1973 has recently covered the ground relating to the medical education at the degree and post-degree levels, we do not consider it necessary to cover the same ground. There are, however, certain aspects of medical education which need emphasis from the point of view of job-oriented education.

11.2 As mentioned in the Report of the Committee on Medical Education (1973), on the basis of population Bihar is required at least 30 thousand medical graduates before the end of 1980 as against the existing numbers of about 10 thousand, but it is not possible to train such a large number of medical graduates of competence within the available resources and time. The Committee on Medical Education, therefore, recommended that the deficiencies in the number of medical graduates should be made up by training of skilled personnel (medical auxiliaries and para-medical personnel).

11.3. The Committee on Medical Education has referred to the fact that some years ago there existed a two tier system of medical education, e. g., the licentiates and graduates. The training of licentiate was non-academic and job-oriented. The Committee examined the demand from certain quarters that, in view of the long gestation period of university trained medical graduates, the high cost of university medical education, the shortage of qualified graduates needed for the Committee to provide for the health and medical care for the community including the rural population and the reluctance of the university qualified graduates to serve in remote rural areas, the licentiate system of medical education should be reintroduced and came to the conclusion that there is no valid reason for attempting to adopt such a course and put the clock back. According to the recommendations of the Committee, scientific medical education designed to produce properly qualified medical graduates must continue to be university education.

11.4. Since, according to the Report of the Committee on Medical Education, it is not possible to train and produce the required number of medical graduates to meet the needs of the population of the State and even the existing medical graduates are not able to go to remote rural areas, the alternative before the large sections of the population particularly of rural areas is, therefore, that they should go without proper health and medical care. In the absence of properly trained personnel for health and medical care people in the rural areas have to depend for treatment upon quacks and persons with little or no training. In the circumstances, it needs to be seriously examined whether the licentiate system of medical education should not be reintroduced even as a temporary and interim measure to be replaced by adequately trained persons, if and when available. If, however, it is considered that reintroduction of licentiate system will be a retrograde step as observed by the Committee on Medical Education (Bihar 1973) and will not meet with the approval of the Indian Medical Council, an alternative arrangement should be considered. We have already recommended in Part I of the Report that a diploma course for basic health worker/health visitor should be introduced and persons so trained should be attached to medical graduates and work in the rural areas under their guidance. It may be useful to train persons with good marks/good

grades in Secondary School Examinations in Mathematics and Science for a period of 3 years and designate them as Health Assistants. They may also be given practical training for one year in hospital after completing 3 years' training. Such persons placed in charge of a big village or smaller village and attached to a medical graduate and working under their guidance and direction can be of considerable help to the population in the rural areas. It is necessary to take a realistic view of the problem of health and medical care of the rural areas. The Committee recommends that so long as it is not possible to make available in the rural areas adequate number of medical graduates, reintroduction of licentiate course of medical education should be considered but if, for some compelling reasons, this is not found feasible, a three-year diploma course for training health and medical assistants who can look after under the guidance and direction of the medical graduates, the health and medical care of the population in the rural areas should be introduced without delay. In order to encourage persons with good academic background to compete for admission to this course, it may be necessary to provide that persons with this diploma and three-years' affective work in the rural areas may be allowed to compete on merit for admission to the medical graduates courses. Admission to diploma course should be restricted to those who pass the secondary school examination with good marks especially in Science. A competitive examination should be held for admission to this course.

11.5. *Introduction of post-graduate courses in Bio-Chemistry and Micro-Biology.*—The Committee on Medical Education, Bihar has mentioned that modern medicine draws from other science—Biological Science, Physical Science, Engineering Science and Behavioural Science. Although there is great need of research in various fields of medical science, there is very little research in medical problems in the State. There is need for organising research in different values including Biological Science. As already recommended earlier, post-graduate degree course in Bio-chemistry and Micro-Biology should be introduced in Patna University. These courses should be conducted in the Post-Graduate Science Department of Patna University in collaboration with Patna Medical College.

11.6. *Dentistry* --In view of the need for more dentists as recommended by us earlier, Patna Dental College should be expanded to provide for a larger intake of students or alternatively the new college of dentistry may be set up at Muzaffarpur.

11.7. *Nursing.*—As already recommended by us a degree course may be introduced in Ranchi and Patna Universities respectively.

11.8. *Physiology.*—We have also recommended introduction of Physiology as one of the subjects for Bachelor's Degree in Science as well as Post-Graduate Degree Courses in Patna and Ranchi Universities. The Post-Graduate course in these subjects should be conducted by the Science Departments of Patna and Ranchi Universities in collaboration with Patna Medical College and Ranchi Medical College respectively.

CHAPTER XIII

METHOD OF TEACHING AND EVALUATION.

12.01. *Method of teaching.*—The method of teaching in higher education should be such as to promote the objective of imparting instructions in skill in the area of study of the student and to develop his power of mind so as to enable him to think for himself and develop problem solving ability. These objectives can be achieved, if the students remain not only passive recipients of the knowledge and skill dispensed by the teachers, but also actively participate in the learning process. The method of teaching has, therefore, to be such as to enable the students to participate actively in the learning process. In any job-oriented education a student has to learn the fundamentals, the practical aspects and the operational skill of the area of his studies and think for himself, and learn how to face problems and solve them.

12.02. Lecture by the teacher to a number of students attending a class is the traditional method of teaching and the system of lecturers is the main and the most important method of teaching in the universities and colleges of the State. Minimum number of lectures in a subject is obligatory for a student, before he is allowed to appear in the examination on completion of courses of students. Most of the students remain passive listeners to the lectures delivered by the teachers and sometimes when they lose interest in the lectures, they do not even listen to and understand the lectures. Sometimes some students take notes of the lecturers, but the number of such students is small and the quality of some lectures is such that a good and serious student will not be able to benefit by taking notes of these lectures.

12.03. Lectures, if they are to serve useful purpose, should be well prepared. Some lectures are the summaries of some text-books or note-books or they are the notes prepared by the teachers when they themselves were students without incorporation of new knowledge which might have been added in the meantime. Sometimes lecturers dictate notes to the students. Such notes dictated by the lecturers mainly aim at preparing the students for examination. If the lecturers merely prepare their summaries of the text-books, the students will not study even the prescribed text-books or any other book and will rely mainly on the lecture notes of the lecturers. Such lecturers can neither transmit knowledge and skill, nor can they develop the thinking and problem-solving ability of the students. It is better for the students to read the text-books in original, and prepare their own notes if they so desire, with the guidance, wherever, necessary, of the teachers and to request them to explain the points they do not follow or understand instead of the teachers merely reading in the classes or dictating to the students summaries prepared by them.

12.04. Lectures are useful in presenting material which is too complex to understand without oral explanation. Lectures can also be useful if the material is contained in too many books and journals which the students may find difficult to read and assimilate or when there are few or no books and the material has to be collected from sources which are not easily available to the students. Lectures should provide the framework of studies by explaining the fundamentals of the subject-matter and their application, if any, to the specific issues and references to the books and journals which the student should study. The lecturer should orally explain the points which are complex and difficult to understand and give, wherever necessary, examples. Students, if they so desire, can prepare brief notes of the lectures which may be developed by them later into well prepared notes with the help of the literature indicated in the lectures.

12.05. Tutorials should be utilised as complementary to lectures. The teachers should receive in the tutorials "feed back" from the students on the subjects-matter discussed in the lecture. Every student in every tutorial class should in turn prepare an essay or written answer relating to the subject-matter discussed in the preceding lecture. The essay and written answer should be presented and discussed in the tutorial class. The teacher should offer his criticism on the work of the student and suggestions for improvement. Other students of the tutorial class should also participate in the discussions.

12.06. In order that each student gets opportunities to write essays or write answers to questions and problems for discussion in the tutorial, the number of participants in the tutorial classes has to be reasonably small. It is difficult to lay down any particular standard in view of the fact that the number of students varies considerably from institution to institution. In no case, however, the number of students studying post-graduate or honours courses should exceed 10 and other classes 15. Teaching in undergraduate classes should be student-centred as far as possible. It will be of advantage to utilise those students of post-graduate classes who have obtained their degree and with good marks in the subjects which they have chosen for study in post-graduate classes to take up a limited number of lectures and conduct tutorials. Payment at a reasonable rate should be made to them for this. This system may be advantageous in two ways: (i) It will be possible to discover the potentialities of post-graduate students for the positions of teachers; and (ii) it may enable some poor students to supplement their income to meet the cost of studies.

12.07. *Seminars*.—The difference between tutorials and seminars lies in the fact that, while the former is student-centred, the latter is subject-centred. The number of participants in the seminar is larger. A seminar begins with reading of a paper or an essay by one of the participants who may be a teacher or a student and is followed by discussions. The points made out in the paper presented and discussions in the seminar are prepared in the form of conclusions. Seminars are more suitable for post-graduate classes. Seminars may also be conducted in the final academic year of the students studying courses for honours degrees.

12.08. If tutorials are conducted in the manner suggested in the foregoing paragraphs, it may be possible to reduce the number of formal lectures and increase the number of tutorials in order to enable the students to actively participate in the learning process.

12.09. *Laboratory and experiment*.—Practical work in laboratory is necessary, especially in science subjects in order to train the students in manipulative skills, for illustrating points made out in lectures, for introducing the students to the use of the instruments and techniques, to train him to write report on experiments, etc. It is necessary that the Universities and the colleges in which practical work is an essential part of the courses of studies should have proper laboratory and equipment. There should also be adequate number of lecturers or/and demonstrators to guide and help the students in laboratory work.

12.10. Wherever 'case studies' relevant to topics of teaching are available, they should form the basis for the discussions in the senior classes. These will give to the students ideas about tackling problems and taking decisions in real situations. There are only a few 'case studies' in the country and only very few in the State. 'Case studies' relating to social science subjects, engineering, irrigation and industrial projects should be prepared in the State not only for use in teaching in the

higher classes, but also for the training of administrators, technocrats, project officers, etc.

12.11. We are aware that in the conditions now prevailing in the universities and the colleges of the State, difficulties will have to be faced in implementation of the recommendations for improvement of teaching and active participation of students in the learning process. Although in large number of educational institutions, lectures are, by and large, the only effective method of teaching, it is not possible to complete even the prescribed number of lectures because of various factors some of which are outside the control of universities and educational authorities. If, however, higher education is to serve its aim and objectives, including instructions in skill and promotion of power of mind, conditions have to be created in which the quality of education has to improve.

12.12. The community, administration, the university, guardians and students have all to play their part in creating suitable conditions in which steps can be taken to bring about improvement. We, however, want to emphasise once more the vital role of the teachers in bringing about the improvement in this respect. We have already recommended that only persons who have uniformly good academic achievements and who have real interest in teaching should be appointed on merit, as teachers in the institutions of higher education. We hope that the teachers will take initiative and actively work for improving the quality of higher education.

12.13. The Universities and the Education Department of the State Government have to ensure, by proper planning and strict inspection and supervision that only institutions which serve a genuine and felt need are allowed to be established and they have adequate facilities for ensuring proper quality of education.

12.14. *Facilities and equipment for teaching.*—It is necessary that there should be adequate accommodation for lectures, tutorials and seminars in the colleges and the universities. As mentioned at several places in the report, there are many colleges which have no adequate accommodation, in fact, some of the colleges which have been in existence for years have not even their own building and conduct their classes in the buildings of some school or temporary building which do not provide suitable accommodation for conducting lectures, tutorials, seminars and laboratory work. The Committee has, therefore, recommended that no college or educational institution should be allowed to be set up or recognised unless it fulfils the minimum conditions which are necessary for conducting teaching work on a reasonably satisfactory basis.

12.15. *Accommodation for teachers.*—It is also necessary that the teachers themselves should have satisfactory accommodation for pursuing their own studies or for carrying research and for being available for consultation to the students when they are free during college hours from lecture work, tutorials or seminars. Since teaching in a large number of colleges is conducted mainly through lectures and only a few good institutions have satisfactory arrangements, for conducting tutorials and seminars, there is only formal contact between the students and teachers in such colleges. In students-centred education which is necessary for imparting instructions in practical aspects and operational skill, besides the conceptual knowledge of a discipline at the under-graduate stage, it is necessary that the students should have all facilities to consult their teachers even outside the lecture and tutorial rooms on not only the problems relating to courses of studies but, also on personal problems, if the students desire to do so.

12.16. *Library*.—Of all forms of facilities and equipment for good education, books and journals are the most important. It is, therefore, necessary that each university and each college should have a proper library in which books and periodicals relating to various disciplines as well as of general interest should be available. Students are expected to purchase a minimum number of text-books prescribed by the universities. The prices of some of the text-books, particularly those relating to science subjects are quite high and it may be difficult for the students coming from lower income-groups to purchase such highly priced text-books. In order to help such students multiple copies of important and highly priced text-books should be kept in the libraries. In addition, multiple copies of important books relating to various disciplines which are required for reference and study should also be kept in the library.

12.17. However, it should be appreciated that a good library implies more than a collection of good books and periodicals. The value of library lies in its proper utilisation by the teachers and the students in pursuit of their professional and academic interests. It is necessary that suitable reading rooms should be available in the library together with the arrangements for keeping libraries open not only for hours and the universities and colleges remain open, but also for reasonable hours in the morning and evening during which the teachers and the students can utilise the library. The additional expenditure on maintenance of additional staff for keeping the library open during morning and evening hours will be more than compensated by its contributions to improvement in the quality of education.

Universities and colleges should have arrangements for giving instructions and guidance to the students who are new to the college on how to make the best use of the library facilities. Printed booklets incorporating instructions regarding to use of library may be made available to the students. In addition, arrangements should be made for use of the library by the students under the supervision and guidance of the teachers.

12.18. *Examination, assessment and evaluation*.—Teaching methods and examinations are inter-connected in many ways. Examinations form an important part of the students' academic life. Examinations loom large in the activities of the universities of the State, so much so, that competence of a university in the State is very often assessed by its ability to hold examinations in time without disturbance and in a fair manner. For many years there have been dislocations of the traditional examination system and the universities had found difficulty in holding examinations on the scheduled dates, without disturbance and in a fair manner.

12.19. Some have blamed the traditional system of external examination itself for the partial breakdown of and dislocation in the system. According to them examination held for three hours at the end of one or two years' course is not a fair system of assessment of achievement of the students. Such a system puts premium on 'selective' studies and memorisation of facts and knowledge and favours the fortunate people who can luckily correct guesses. There is no reliable standard for proper assessment of the answer books and the marks awarded to the students on the basis of answer books written by them in three hours are not the real criteria of their achievements.

12.20. Suggestions have been made from time to time that the system of external examination should be replaced by the continuous internal examination system according to which those who teach should also examine and evaluate the achievements. Some have advocated that the semester system of teaching and assessment

should be introduced in the universities and the colleges of the State and achievements of students should be judged on the basis of their performance in the class, in tutorials and in semester examinations held at comparatively short intervals and covering shorter courses of studies. Some people favour the students being allowed to consult books for answering questions in the external examinations.

12.21. In this connection, reference may be made to a "plan of action" regarding examinations endorsed by the University Grants Commission, New Delhi. According to the recommendations made in the "Plan of Action" university should decentralise examinations by allowing the affiliated colleges to hold examinations retaining for itself, the power of broad supervision and the power to advise the colleges in this respect. Recommendations have also been made in this "Plan of Action" that the Board of Studies established by the universities should prepare the syllabuses and a "Bank of questions" for each of the courses. Colleges should be allowed to hold the examinations under the supervision of their own staff and the examination questions should be selected from the "Question Bank". The scripts should be examined by the teacher concerned at the colleges and the answer books should be returned to the candidates. The mark system should be replaced by the grade system and the grade card issued to candidates should show the record of continuous internal assessment side by side with the examination grades.

12.22. It will appear that the "Plan of Action" endorsed by the University Grants Commission is in favour of continuing the traditional system of examination to be held on a fixed intervals of one or two years on completion of a prescribed courses of studies, but with this difference from existing system that instead of the universities conducting a centralised examination on a decentralised basis and the teachers of the affiliated colleges who teach should examine the answer paper and award grades in place of marks. The university should, however, retain the powers of supervision and advice. In addition, there should also be continuous internal evaluation.

12.23. It is difficult to accept the proposition that the system of the traditional external examination is responsible for all the evils associated with the examinations in the State. There are many countries in the world including advanced countries and countries with different systems of Government which have been continuing, with variations, the system of external centralised examinations. Some supplement this system by holding periodical examinations which may or may not be taken into consideration in assessment of the overall achievements of the students. Sometimes only those who teach examine the students, in other cases persons who do not teach are associated with the persons who teach and sometimes persons who do not teach alone examine the students with answer books. There are, no doubt, some shortcomings in the system of centralised external examination which become apparent when a university in this State has to conduct examinations for assessing the achievements of thousands of students of a large number of colleges many of which are ill-equipped and not properly staffed and in which the teaching methods and teaching are not up to mark. The number of examiners being large, it is difficult to ensure uniformity in assessment. Many examiners are found to be lacking in objectivity and impartiality. The questions selected sometimes aim at testing the power of memorising instead of power of thinking, understanding and expressions. Some of these shortcomings are, to a large extent, attributable to the shortcomings in the people operating the system rather than in the system itself. There are no doubt some shortcomings in the system also and there is need and scope for its reform, but care has to be taken to see the reform is an

improvement and it does not destroy the old system without substituting a better one. Assessment and evaluation, as already discussed, are closely linked with the method of teaching and the quality of teacher's teaching, examining, assessing and evaluating the achievements of students.

12.24. It is true that the semester system of teaching and examination has some advantages; evaluation is linked with teaching in this system. However, this system has also come in for criticism even in the U. S. A. where it has been most extensively adopted. Complaints have been made that in order to earn popularity among the students, there is tendency in the teachers to be very liberal, in assessing students' achievements. Besides, there are, for successful operation of the semester system, certain pre-requisites which do not exist in the universities and the educational institutions of the State. For successfully operating the semester system it is necessary to have adequate facilities including facilities for teaching, accommodation, laboratories, equipment, libraries, etc. As already mentioned, these facilities do not exist in large number of institutions of higher education in the State. The ratio of teachers to students has to be very favourable in order that the teacher will have full and intimate knowledge of his day-to-day performance. Of very great importance is the requirement of objectivity and impartiality on the part of the teachers. People and students should have full confidence and trust in impartiality of teachers

12.25. As has been observed earlier, adoption of internal system of assessment, even on a very limited scale, in the Secondary School Examinations in 1950's led to abuses on a very wide scale and had to be given up. Even now system of internal evaluation has been adopted on a limited scale, for sessional and practical work in the courses for engineering degrees, but there are complaints that the marks obtained by students for sessional and practical work are much higher than those obtained by them in the corresponding theoretical papers and are not fully reliable. Unless there is substantial improvement in the existing atmosphere and an atmosphere of trust, integrity and good faith is established, it is not possible to substitute fully the external examination by the continuous internal evaluation system or the semester system.

12.26. Rajendra Agriculture University has introduced semester system of teaching and evaluation. Since only a limited number of institutions—3 Agricultural Colleges and 2 colleges for Animal Husbandry and Veterinary Sciences—are under this university, it may be possible to closely supervise the operation of this system. The ratio of teachers to students is also favourable. This is job-oriented professional course and the students who study in these colleges are more serious than those studying in ordinary Arts and Science Colleges.

12.27. It will be desirable to evaluate the result of the semester system introduced in Rajendra Agricultural College after five years and examine, on the basis of the results of the evaluation, to what extent it can be extended to institutions conducting other professional courses.

12.28. While considering the question of examination reforms the Education Commission (1964—66) observed as follows :—

“We realise, however, that external examination will be with us for a long time, especially in the universities which have large numbers of affiliated colleges of very unequal standards.”

The Commission suggested that system of internal system should be introduced as a supplement to the external examination, based on periodical examinations and the results of the internal assessment should not be mechanically added to the marks obtained in the external examinations, but kept separate and both should be shown side by side, in the final certificate. In addition to the introduction of internal assessment as a supplement to the external examination as recommended by the Education Commission (1964—66), there is also scope for improvement in the system of external examination itself.

12.29. At present, one external examination is held at the end of 2-year Intermediate course; another external examination is held at the end of 2-year undergraduate courses; and a 3rd examination is held at the end of 2-year course leading to Master's degree. It is neither desirable, nor fair to examine and assess the achievements of a student in the courses of studies covered by the two academic sessions by only one or two or three examination papers of three hours each. The Committee, therefore, recommends that an external examination should be held by the university at the end of each academic year in respect of courses covered in that academic year. This should be supplemented by assessment made by the teachers in the work done by students in tutorial classes and seminars, if any. In addition, two periodical examinations should be held in each academic session and the students should be examined in the courses covered up to the time of the periodical examinations of each academic session. The written work and answer books of the students containing their work in tutorials and answers in the periodical examinations should be returned to them with the remarks, if any, and grades awarded. After the students have seen them they should be kept and grades awarded should be entered in the registers. The achievement of the students in the tutorial classes and the periodical examinations should be shown in a separate column in a certificate or degree given to the students. The university should make every year a careful review of the co-relation between internal and external assessment for each institution as suggested by the Education Commission (1964—66), with a view to assessing the reliability of the assessment by the institution.

12.30. If on the basis of the periodical review by the university, an institution is able to establish its reputation for fair and objective internal evaluation over a period, it may be authorised to conduct internal evaluation in respect of 30 per cent of marks allotted to a course of study, the remaining 70 per cent being kept for the external examination. A candidate will be allotted separate grades for his achievements in the external examination and internal evaluation. The university, however, should continue to make periodical review of the internal evaluation conducted by such institution and if, as a result of the review, it is found that no reliance can be placed upon its internal evaluation, the facility of internal evaluation given to the institution should be withdrawn. If, on the basis of the periodical review a particular institution is able to establish its reliability over a reasonable period, it may be authorised by the university to conduct, under its supervision, examinations and evaluation as suggested in the "Plan of Action" endorsed by the University Grants Commission.

12.31. The Committee recommended introduction of the system of awarding grades to the students instead of marks to indicate the level of performance of the students in the examinations and evaluations. The recommendations made in this respect in paragraph 7.25 relating to school examination should be applicable to the examinations and evaluations in undergraduate and post-graduate courses also.

12.32. It is necessary to adequately train teachers selected for examining answer books and evaluating the achievements of the students in satisfactory and reliable

methods of examining papers and evaluations. Each university should make arrangement for such training. The head examiner should ensure by prior discussions and re-examination of certain percentage of answer books that the standard of examining the papers is, as far as possible, uniform.

12.33. The Committee wants to reiterate once more that examination and teaching are so interlocked that, unless a minimum level of satisfactory teaching on the lines already discussed is ensured, there will be difficulty in ensuring a satisfactory system of examination and evaluation.

12.34. Since the success of the internal examination system recommended in the 'Plan of Action' endorsed by the University Grants Commission depends upon the quality and integrity of the teachers and confidence of the public and the students in them, it is necessary that the system of internal evaluation, even on a limited scale should be first introduced only in those institutions which have teachers of competence and integrity and who enjoy confidence of the public and students.

The Committee recommends that the scheme of internal examination may first be tried in the post-graduate classes conducted by the university in their direct supervision. Later they should be introduced in the special honours and combined honours courses which, as already recommended, should also be conducted by university themselves under their direct supervision. It is, however, essential that before the introduction of the system of internal examination and internal evaluations, as recommended in the 'Plan of Action', endorsed by the University Grants Commission teachers of competence and integrity should be made available to the universities and the departments conducting these courses.

12.35. Even otherwise, it is necessary that the departments of the universities conducting post-graduate and special honours and combined honours courses should have very competent teachers who can arouse intellectual curiosity and desire for knowledge and skill among these students. The number of such teachers are very small and even if the small number of teachers with competence who are available are thinly distributed over a number of colleges, their impact on improvement of quality of education will be negligible. On the other hand, with their concentration in the departments of the universities, there will be an intellectual community in each of the universities. Inter-action among various members of the intellectual community and between the teachers and the students will raise the level of higher education in the departments of the universities.

12.36. An objection may be raised that it will promote 'elitism' and will be against the democratic spirit of equality. Democratic spirit does not mean that equality should be achieved only at the lowest level. If the teachers of competence were available in large number they could have been distributed to a large number of institutions, but since the number of such teachers, as already mentioned, are comparatively small, it is necessary to make them available in departments of universities institutions which will conduct high level courses and which are capable of high standard. With the efforts of such teachers and high level of post-graduate courses and of special honours and combined honours courses, it should be possible to turn out persons of competence to fill up the posts of teachers of the colleges, scientists, research workers, administrators, managers, technologists, medical specialists, etc. Many of the products of such high level courses will be appointed as teachers in colleges and they, in their turn, should be able to raise level of education in those

institutions. It should be appreciated that we have to make a beginning somewhere and, in the absence of adequate number of competent teachers, we cannot begin with the implementation of the programmes for raising the quality of higher education in all the institutions at one and the same time. We have, therefore, to start with the department of universities which will conduct post-graduate courses, special honours courses and combined honours courses. In this connection it may be worthwhile remembering that even in the societies which are more egalitarian than ours, there are institutions like Oxford, Cambridge, Harvard and Moscow University and higher institutions in Moscow which attract brilliant teachers and students. Even in our own country certain institutions like Indian Institute of Technology and some institutes at Delhi attract the best talents. It is necessary that some of our own universities should be able to acquire such a reputation and work as catalysts to improve the standard of education in other institutions of this State.

12.37. It is also necessary that other facilities for raising the level of education have to be provided in adequate measures to the institutions conducting post-graduate honours courses and combined honours courses. However, such facilities should also be provided on a phased basis to other institutions which, on the basis of the plans approved by the universities and the Government, are required in the State to serve the need of higher education. Apart from facilities relating to teaching accommodation, laboratories and equipment, libraries, play-fields, it is necessary that adequate arrangements should also be made for hostels for accommodation of the students, specially in the headquarters of the universities which, as recommended by the Committee, will conduct post-graduate courses and special and combined honours courses and attract students from different parts of the State including a considerable number from the rural areas. Hostel accommodation for majority of the students is also necessary in engineering, medical and other professional institutions. Hostel accommodation should also be provided in other colleges which, because of their reputation, are able to attract students from long distances. Satisfactory hostel accommodation is necessary for those who come to institutions from long distances and from the rural areas.

12.38. Before we close the consideration of the teaching method and evaluation we would like to emphasise that the examinations must be held in time and on the scheduled dates. Almost all the examinations, excepting the intermediate examinations, in all the universities of the State are about 1-2 years behind the dates on which they should have been held. Even the intermediate examinations are being held some months behind the dates on which they should have been held. Students of the universities of the State find difficulty in entering All-India Engineering institutions like Indian Institute of Technology and other All-India professional institutions in the year in which they pass the intermediate examination, because the results of the examinations are announced very often after the last date of admission to these institutions of all-India reputation. Students of degree and post-graduate degree have sometimes to spend 1-2 years after courses of their studies for appearing in their examinations. Sometimes the duration of the courses including those of the engineering and medical courses is extended, because the universities, under pressures, postpone the dates of the examination or/and the courses of studies are not complete within the prescribed academic terms. The result is that students of the universities of the State are not able to obtain their degrees or post-graduate degrees or professional qualifications in the same year in which their counterparts obtain elsewhere in the country and they, therefore, lose their chances for competing for All-India Services, Central Services and positions in public and private sector

undertakings the same year in which students from other universities of the country are able to compete. In the absence of proper synchronisation of the completion of courses of studies, holding of the examinations and announcement of results students complain that they forget whatever they have learnt by the time the examinations are held, and after the examinations are held and the results are announced, they have to wait for a year or so before they can compete for All-India Services, Central Services and positions in public and private sector undertakings. They feel frustrated and find that they do not fare very well when they have to appear at the competitive examinations or for interviews, about two years after completion of their courses of studies and almost one year after their examinations are held and their results are announced.

12.39. The Committee recommends that, in order to give proper opportunities to the young people of the State for entry into All-India Institutions of reputations including engineering and medical institutions and for competing for All-India Services, Central Services and for various positions under the public and private sectors, all efforts should be made to complete the courses of studies and to hold the examinations, according to the prescribed schedules. The Committee also recommends that the examinations should be held in a fair manner under strict supervision so that the results of the examination correctly reflect the achievements of the students. Experiences of holding the Bihar Secondary School Examination in 1973 and 1974 and the university examinations in 1973 indicate that it is possible to hold the examinations in a fair and impartial manner. Employers lose faith in certificates, diplomas and degrees awarded on the basis of the examinations which are not held in a fair manner and this adversely affects employment opportunities open to young people of the State.

12.40. The Committee suggests that a date line (which may be the end of June, 1976) may be fixed for completing all the pending examinations of all the universities in order that from the beginning of the academic session, 1976-77, each examination may be held on the dates on which it is due and in no case any examination is postponed beyond the last date by which it is to be completed.

The Committee understands that the system of supplementary examination is one of the important causes for dislocation of the examination system. Keeping in view the number of students who succeed the supplementary examination the Committee is of the view that the system of supplementary examination should be done with. In fact, if grade system of assessment recommended by the Committee is introduced there will be no need for holding any supplementary examination. As recommended by the Committee in earlier portion of the report, those who want to improve their grades may be given a second chance but not more than the second chance to improve their grades by appearing at the next annual examination.

CHAPTER XIII

MISCELLANEOUS TOPICS/OPEN UNIVERSITY/CORRESPONDENCE COURSE/SOCIAL SERVICE/REQUIREMENTS OF DEGREES, DIPLOMAS AND CERTIFICATES FOR EMPLOYMENT/TRAINING FOR SELF EMPLOYMENT AND ENTREPRENEURSHIP.

13.1. *Open University/Correspondence Course*.—We have so far considered mainly formal university education. Education may be imparted and acquired through a multiplicity of means including formal and informal education. A person who has missed higher education at a particular point of age, because of poverty or for any other reason, but is anxious to pursue it later should not be denied the opportunities of acquiring it. It has been suggested that entry to higher education need not be confined to only those who are successful in formal examinations. In this context suggestions have been made for having an open university or university without wall.

13.2. An open university was set up in Great Britain in 1969-70. The basic principle on which the open university was set up in Great Britain are—

- (i) *Openness to the students*.—No formal academic qualifications are required for registration of students. There is, however, an element of selection inasmuch as that no student below the age of 21 years is accepted for registration in the university. The minimum age of 21 years for registration of a student has been fixed, because the university was not established as a rival to other universities but as complementary to them.

Although no formal academic qualification is required for registration for students to the open university, those who register themselves as students have no satisfaction during the early stage of the course that they are capable of pursuing the course of higher study for which they are registered.

- (ii) *Openness to curricula*—Education offered by the curricula of open university is built upon a broad and strongly integrated base. It is a combination of the British system of courses which are largely determined by a terminal examination at the end of the courses and are, therefore, too inflexible and the American system of multiple small courses which are too fragmented. The evaluation of students' work is partly by continuous assessment and partly by an examination at the end of the each course.

- (iii) *Openness as method of presentation*.—Presentation is made through radio and television programmes as well as by correspondence. Experiments in Science courses are done by observation in everyday life, by supply of a Home experiment kit and by organising summer schools for intensive laboratory work. Students are also exposed to demonstration experiments on the television. Books considered to be necessary are published and supplied at low prices.

13.3. It will appear that the radio and television programmes are important technological means through which the open universities function. It will take some years before television can be used as a means for transmitting knowledge and giving guidance of students in our State. There are at present difficulties in conducting

courses on a regular basis even through the radio. The only important means of communication between the teachers and those who may not be required to attend formal classes is through correspondence. It will, therefore, be advisable for two or three universities of our State to conduct correspondence course for teaching. These correspondence courses may be started by Patna and Ranchi Universities for the time being. Teaching through correspondence course should be supplemented by part-time teaching in selected institutions including engineering and technical institutions in the cities and the towns in which adequate number of persons already employed want to pursue higher education without interrupting their professional or occupational activities.

13.4. In order that the correspondence courses are successful, they should be properly organised. These courses should, in fact, be an improvement upon the courses which are conducted in the colleges and the universities because, whereas in the latter, the students come face to face with the teachers and may seek their help in solving their problems and resolving their doubts, in the former, they have to depend more upon the written materials and guidance given in writing.

13.5 Teaching should be conducted through correspondence not only in the disciplines relating to the humanities and social sciences but also natural sciences. Arrangements for laboratory work and practical experiments can be made in the existing institutions during summer and Dusshera vacations and other holidays. Arrangement should be made with the employers for allowing the employees to take leave during the period for laboratory and practical work. One of the disadvantages of the correspondence course is that the teacher and the students do not have the opportunity to meet face to face. It should be possible even for the students studying the humanities and social sciences subjects to meet the teachers of the correspondence course at least twice a year at selected places for discussions. Students of the science subjects will meet the teachers face to face when they take up laboratory and practical work and have their discussions with them.

13.6. The correspondence course should be organised by the institute of correspondence course functioning as a separate unit under a Director. The Director should have adequate administrative and financial powers. The teachers of the correspondence course should be wholtime teachers. It will not be possible for the existing teachers of the universities and the colleges to do justice to their teaching work in the universities and the colleges in which they have to work wholtime and at the same time also work as part-time teachers in the institute of the correspondence course. The teachers of the correspondence course should prepare lessons which should be vetted by a committee of senior teachers of the relevant discipline. The number of lessons to be prepared by each teacher each month and each academic session should be prescribed and arrangements should be made to cover the entire course through these lessons within the prescribed academic period. The written work to be sent by the students and to be corrected by the teachers every month and during each academic session should be prescribed. Time-limit for correction of the lessons and returning them to the students should also be prescribed. Time-limit for correction of the lessons and returning them to the students should also be prescribed. The dates on which lessons will be sent to the students of the correspondence course should be prescribed and it should be ensured that the lessons are sent on those dates. Performance of each student enrolled in the correspondence courses should be assessed on the basis of the written work and work in the laboratory where such laboratory work is required and only those who receive 40 per cent

marks or are categorised as satisfactory on the basis of these assessments should be allowed to appear at the final examinations.

13.7. Arrangements will have to be made for the availability of text-books and other reference books to the students enrolled for the correspondence course as well as for part-time courses in selected centres in which appreciable number of such students are enrolled in these courses. Apart from the arrangements for supply of such books from the libraries of institutions in which part-time courses are conducted to students of these courses, arrangements may have to be made with the important employers for keeping in and making available such books from their own libraries to the students of the correspondence course. If it becomes necessary, the institute of correspondence course may have to open a regional office under a Deputy Director in a place where the number of students enrolled in these courses justify location of such a regional office. If necessary, the Regional Office may have its own library for supply of text-books and other reference books to the students enrolled in these courses.

13.8. References have already been made to the arrangements for part-time courses in the technical institute of an employer in the State for giving opportunities to its employees to improve their qualifications and upgrade their skills and thereby qualify themselves for promotion to higher positions. The institute of correspondence course should make arrangements with those employers who have their own training institutes for making available facilities in their institute for part-time courses. There should be a co-operative arrangement between employers and the university for conducting such courses. Libraries of such institute should be persuaded to maintain adequate number of text-books and reference books for those who want to continue further studies, part-time or correspondence courses.

13.9. Since the courses will be conducted by the existing universities of the State, the normal rules and statutes for admission to degree or post-degree courses should apply. In the present circumstances, there will be difficulty in adopting the criteria of 'openness' regarding the admission of students and the curricula.

13.10. Depending upon the number of students who are enrolled, the university may, in due course, have to open regional office each under a Deputy Director so that the limited number of teachers at the headquarters of the university may not be required to deal with large number of students.

13.11. If and when it becomes possible to use the media of radio or/and televisions, on a regular basis for educational purposes they should be used for conducting correspondence courses also. In the light of the experience of the correspondence courses and the facilities of giving lessons on radios and televisions, if and when fully available, a review may be made after five years regarding the extent to which the idea of open university can be adopted in the circumstances then prevailing in the State.

13.12. If a person wants to pursue study in a single subject which he considers necessary or desirable for improving his competence in that subject or/and for its utility to him, he may be allowed to do so through correspondence course and appear at the examination to be held for that course only. If he passes in that subject he may be given a certificate certifying that he has attained the standard of competence of a degree-holder in that subject.

13.13. With suitable arrangements on the lines indicated in the foregoing paragraphs, the correspondence and part-time courses will not only help the individuals who, for one reason or the other, have not been able to pursue higher education and have entered some vocations or professions and are anxious to improve their qualifications but will also serve a social purpose of ensuring equality of opportunities to a considerable extent. With such arrangements the vocational education, recommendations regarding which have been made in Chapter 4 will no longer remain blind alleys for those who enter them. Persons with the vocational qualifications who have entered some occupations will be able to improve their qualifications and upgrade their skills for advancement of their careers through correspondence or part-time courses.

13.14. *Social Service*.—Suggestions have been made that before a degree is awarded to a student he must compulsorily render social service for a fixed period. This will enable him not only to learn useful and productive work but also to familiarise himself with the conditions of the people, particularly in the rural areas. The work of social service to be rendered by the students should include, among others, items like digging canals, ponds, construction of rural roads, participation in adult education and agricultural operations and cleanliness programmes in the villages and slum of the urban areas. During the period of social service the students should also participate in cultural activities, and intellectual activities not relating to schools.

13.15. In the context of the economic and social conditions prevailing in the State such a scheme can prove to be useful not only to the students but also to the society. We have a very large number of educated people who are waiting for jobs and are getting frustrated because they find no scope for making useful contributions to social and economic activities. On the other hand, there are vast economic and social problems tackling of which requires dedicated and educated young people.

However, in the absence of total planning of social and economic activities, there are difficulties in organising programmes of social services for large number of college and university students every year.

13.16. A National Social Service Scheme in which only a limited number of students of the universities and colleges can participate is in operation even now. It is expected, students of the universities and colleges will participate in one of the three activities—

- (i) National Service Scheme, or
- (ii) National Cadet Corps, or
- (iii) Sports and recreational activities.

In actual practice only a minority of the students enrolled in the universities and colleges participate in any of these activities.

In the absence of proper organisation and co-ordination the universities and the colleges have found difficulties in organising National Service Scheme for the students in a purposeful manner and even the limited funds made available for this purpose have not been utilised by them. Plans have been formulated by the Central Government for participation of a larger number of students in the

national social service scheme during the Fifth Five-Year Plan period. In the absence of full control over the planning of social and economic activities, there will be difficulties in making social services compulsory for all the students attending universities and colleges. Adequate funds are also not likely to be available for this purpose. However, arrangements can be made for a larger number of students to participate in National Service Scheme with proper planning and co-ordination. The present arrangement for participation in the Social Service Scheme of the students who are members of N. S. S. are too sporadic and unco-ordinated to make an impact on the minds and habits of the students.

13.17. There is, at present, a committee at the State level to co-ordinate the programme relating to National Service Scheme for students. This committee considers mainly matters of broad policies and co-ordinates. It is necessary to have a committee at the district level in which the representatives of the Government and other agencies responsible for developmental and social activities including those of the Education Department and Zila Parishads (where they exist) and those of the colleges are represented. The committee at the district level should draw up list of schemes and projects in which students who are members of N. S. S. should participate and the period during which they should participate. These schemes should include participation of the students not only in labour and social service camps but also in activities like adult education on part-time basis in the villages and mohallas of the participating students. We have already recommended payment of honorarium to the students who participate, on a regular basis, in the scheme of adult education on a part-time hours. The District Level Committee should select one or two projects in which students from different colleges can participate at different periods throughout the year.

13.18. Those students who do not participate in National Service Scheme should join either the National Cadet Corps or participate in sports and recreational activities. The usefulness, from the point of view of jobs of participation in N. C. C. has already been discussed. Apart from its usefulness in matter of appointments in the Armed forces and Police Participation in N. C. C. inculcates qualities of discipline, leadership and initiative among young people. These qualities will prove useful to the young people in whatever employment, they may take up on completion of their education.

13.19. As has already been mentioned, proficiencies in sports and games may prove to be useful to young people in securing employment in some organisations. There are no adequate arrangements for sports, games and cultural and recreational activities in most of the colleges in the State. Even in the colleges in which there are facilities for these activities few students take advantage of them. Facilities for sports, games, cultural and recreational activities should be such as to enable and encourage participation of larger number of students.

13.20. While social service, N.C.C. sports and games and recreational activities should not be included in the syllabuses of formal external examination, achievements on the basis of internal assessment of a student in one of these activities which he takes up should be recorded in the degree or diplomas awarded to him. The achievement should be recorded in terms of grades, etc., in the same column on which their achievements in the course of studies are recorded on the basis of internal assessment.

13.21. *Requirement of Degrees Diplomas and Certificates for employment.*— Suggestions have been made from time to time that in order to control inflation in

higher education, drastic changes in the rules of recruitment to the public services should be made and there should be no minimum qualifications requiring possession of degrees or even certificates of secondary school examination as the minimum qualification for recruitment to any post. Implications of these suggestions are that the recruiting authorities will have to devise their own criteria and norms for recruitment to various positions. When no degree or certificate is prescribed as the minimum qualification for recruitment to any public service, thousands of persons with varying degrees of competence or even no competence will offer themselves for recruitment and it will be impossible for recruiting authorities to take any decision about their suitability by only interviewing them. They will, therefore, have to hold written examinations at least for eliminating those who are *prima facie* unsuitable. The result will be that the headache of the educational authorities of holding examinations and determining competence will be transferred to the recruiting authorities of the Government Departments and Government Corporations. There is no reason why the educational institutions and education authorities should evade the responsibility of assessing the achievements of the students in terms of degrees, diplomas, certificates and grades.

Since the industrial and business concerns in the private sector will not be obliged to follow such a decision of the Government, students will continue to enrol themselves for higher education in the hope of securing employment in industrial and business concerns in the private sector.

The suggestions that no minimum educational qualifications should be prescribed for employment under Government is not based on correct diagnosis of the problems of enrolment for higher education. As has been mentioned earlier, one of the main reasons for enrolment for higher education is the fact that students completing secondary education have at present nothing else to do and instead of remaining idle they enrol themselves for higher education.

13.22. An alternative suggestion is made that instead of recruiting persons to positions requiring possession of a degree, it will be desirable to recruit them as soon as they complete secondary or higher secondary examinations and train them in disciplines and practical skill relevant to the employment position for which they are recruited. The argument is that it is better to catch persons when they are young for public services on the same lines as the recruitments made for the Commissioned rank of Armed forces. It will then be possible to train and mould them properly for public service. This suggestion has no doubt some merits, but the present system in which maturer persons who have received general knowledge in width and also in some depth in some areas are recruited has also its own advantages in a parliamentary democratic system. This suggestion needs to be examined in depth on its own merit by experts. Implementation of even this suggestion will not, however, automatically lead to control over unplanned enrolment for higher education. In fact, there is no escape from the necessity of direct control over unplanned growth of enrolments for higher education.

The ultimate remedy, however, is in the more rapid growth of economic and social activities and increase of production and productivity in all sectors—primary, secondary and tertiary and to relate education beyond the compulsory education up to 14 years of age to the economic and social activities.

13.23. *Training for self-employment and entrepreneurship.*—Mention has been made over and over again to the fact that there is a very large sector of self-employment

in the State. People owning land and engaged in farming are almost entirely self-employed. So are the persons employed in the traditional industries and trade in the rural areas. Persons owning and operating small-scale industries in the modern sector are also self-employed. As already mentioned, there is considerable scope for development of small-scale industries in the modern sector. There is also a large self-employment sector in trade and commerce in the urban and the semi-urban areas. Mention has also been made of the fact that young people of the State are not keen of taking up self-employment in agriculture, small-scale industries or trade and commerce. Some of the important reasons for such attitude on the part of educated young people of the State are lack of entrepreneurship and self-confidence and want of experience of such work except in agriculture in the families of these young people.

13.24. *Another important reason for the inadequacy of infrastructures for development of agriculture and small-scale industries.*—The pressure on agriculture in the State is very heavy and only one in thirty agricultural holdings in Bihar which has 15 acres or more land may be said to be viable and, therefore, suitable for self-employment for educated persons. There are inadequate irrigation facilities in the State. In many parts of the State, communications are not well developed. Cost of electricity for irrigation as well as for small-scale industries is comparatively high and credit facilities through banks, and co-operative societies for development of agriculture and small-scale industries are inadequate in comparison with those in the advanced States of the country. As has been mentioned, infrastructure in education is also inadequate inasmuch as the percentage of literacy, according to the census of 1971, is about 20 per cent as against 30 per cent for all India. Even the facilities in respect of health and medical care services are inadequate in the rural areas.

13.25. The terms of reference of this committee do not include development of infrastructures other than education necessary for economic and social activities. We shall not, therefore, deal with the problems of infrastructures other than education and shall rest content with observing that, infrastructures required for development of self-employment sectors need to be developed fully in order to create conditions for absorption of a large number of young people in self-employment sector.

13.26. Our recommendations for educational programmes in this report, if implemented, will provide young people with skills and ability required for development of agriculture and small-scale industries on modern lines. The educational problem which has been recommended at different levels, if implemented, should also be able to develop and prepare young men who may think for themselves and acquire self-confidence. Formal educational programmes alone may not, however, develop the quality of entrepreneurship required for taking up self-employment. The quality of entrepreneurship is the results of many factors including environment, traditions, education, training, etc. In the educational programmes that have been recommended we have emphasised practical aspects and operational skills of knowledge and value of practical training in agriculture, industries and other sectors. We have also recommended research and development in Engineering Institutions for helping young people who come forward to manufacture articles required by the industries including those which are being imported at present. If these programmes are implemented, it may enable a large number of educated young people to take up self-employment.

13.27. In addition to the implementation of the educational programme that we have recommended, it is necessary to conduct programmes for training young people in entrepreneurship, some programmes are even now being conducted by the department of industries in the State in collaboration with small-scale industries service

institute. There is need for making such programmes more practical and specific. Such programmes should be conducted in collaboration with the existing industries, wherever feasible. A number of State Development Authorities have been appointed for development of agriculture and small-scale industries in other sectors of economy in different areas in the State. The Area Development Authorities should conduct training programmes in their areas for educated young people of their areas with reference to the specific programmes of development in the areas concerned. The training programmes should be followed up by extension work among the trainees. The Area Development Authority should also ensure that infrastructures required by the educated entrepreneurs are made available to the young entrepreneurs who take up self-employment.

13.38. We have recommended that those departments of the universities which are concerned with the practical aspects and operational skills of disciplines with which they are concerned should also conduct short-term courses for those already working and who want to improve their knowledge of disciplines concerned. Educated young persons who are not employed but want to join such short-term courses should be permitted to do so.

13.29. Different agencies of Government should not only actively help those educated young persons who want to take up self-employment but should also continue to keep in touch with them and render assistance to them during the period they are self-employed. Success of those who engage themselves in self-employment will induce others to take up self-employment, whereas, failure will dissuade them from taking employment. Such help should not, however, amount to spoon feeding. The entrepreneurs have, however, to stand on their own legs and the assistance from Government agencies should assist them to stand on their own legs.

Practical training of engineering students and engineering groups should include training not only in big industrial establishments but also in establishment relating to small-scale industries set up by entrepreneurs. Training of engineering students and graduate engineers who show interest in taking up self-employment may be arranged in such establishments. Training programme in these establishments should include not only training in manufacture, maintenance and design but also in the purchase of materials required for manufacture, the marketing of manufactured products, arrangements for credit facilities, etc. Such training of engineering students who want to take up self-employment will be helpful to them in acquiring the knowhow of the manufacturing and business aspects of self-employment.

13.30. *Medium of instructions.*—The medium of instructions in the colleges and the universities of the State in Arts, Science, and Commerce subjects excepting for the teaching of language which is done through the medium of the language concerned is English or Hindi and students can write answers in the examination in English or Hindi or any other modern Indian language recognised by the university. In many subjects there are no suitable standard books in Hindi; many books written in Hindi are in the nature of note-books. Because of deterioration in the standard of English over a number of years, the students find difficulty in studying the subjects through the medium of English and writing answers in examinations in English.

13.31. It is absolutely necessary that in all subjects which the students have to study through the medium of Hindi of suitable and standard books in Hindi should be available. The main objective of Bihar Granth Academy is to prepare suitable books in Hindi in all subjects for use as text-books and reading materials for university and college students. The Academy has prepared a number of books in Hindi

on different subjects. Complaints have, however, been made that the language used in these books specially in subjects of technical nature is not suitable and the students find difficulty in comprehending the subjects through such books. Many books prepared by Granth Academy are Hindi translation of original books in English. The language of such books is not very often easy to understand. Steps will have to be taken to prepare books in language which is not difficult to understand. One of the ways in which it can be done is to have a team of two persons one of whom should be an expert on the subject and the other who can, in translation, use expressions which are not difficult to understand. Translation of Hindi books undertaken by those who know only Hindi and do not have adequate knowledge of the subject-matter may not be easy to understand. Translation in Hindi of English books must be undertaken by those who understand the subject-matter and can express the subject-matter well in Hindi.

13.32. Complaints have also been made that many good teachers prepare note-books for sale in the markets and since the sale of note-books bring more money to them than payment made by Bihar Granth Academy for translation of original books, they are not interested in writing books or translating English books into Hindi in collaboration with Bihar Granth Academy. While teachers should be encouraged to write standard books, writing of note-books by university and college teachers should altogether be prohibited.

13.33. *Financial implications of the recommendations.*—It has not been possible within the limited time available to the Committee to work out the full financial implications of the recommendations. It is also not possible to work out the full financial implications of the proposals at this stage, because in the absence of complete information regarding employment potentials in different vocations and trades, it is not possible to work out the numbers of the institutions for all types of vocational institutions and enrolments in them. The Committee had neither the time nor the resources and staff to conduct surveys and investigations for this purpose. The Committee has, however, entrusted to A.N. Sinha Institute for Social Studies study and investigations in two Development Blocks—one in North Bihar and the other in South Bihar, of the numbers of unemployed educated persons, employment potentials and the types of vocational education and training required for matching employment opportunities in these Blocks. After the results of the study of investigations in these two Blocks are available, it will be possible to work out the approximate expenditure required for implementing the recommendations of the Committee with regard to job-oriented education in these blocks. The results of the investigations are likely to be finalised by October, 1975. Taking these two Blocks as samples, approximate expenditure required for implementing the recommendations, particularly in respect of vocational education, can be worked out for the whole State.

13.34. One of the functions of the proposed State Council for Vocational and Technical Education is to conduct survey of employment potentials in different areas of the State and determine the numbers of institutions of different vocations and the number of enrolments in them. It is essential that this Council should be set up without delay.

13.35. It may, however, be mentioned that implementation of the recommendations of the Committee will not entail large expenditure and, by and large it should be possible to find sums from within the amounts approved for schemes included in the plan for implementing many of the recommendations of the Committee. It will appear that so far as school education is concerned, the Committee has emphasised improvement in the quality of education. There is no doubt that improvement in the

quality of education will require inputs for improvement of school buildings, equipment, laboratories, libraries and play-fields. Provisions exist in the plan of the Education Department for improvements in inputs and improvements in the quality of education. Improvement in the quality of school education involves improvements in teacher education, arrangement and designing of new courses of studies and publication of suitable text-books. There will be no additional expenditure on re-arrangement and designing of new courses of studies and publication of text-books.

13.36. Improvement in teacher education especially education and training for elementary school teachers recommended by the Committee will require some additional money. A rough estimate which has been prepared (Annexure I) indicates that a sum of about Rs. 1,42,80,000 as non-recurring expenditure and a sum of Rs. 13,46,000 per annum will be required for implementing the recommendations of the Committee for improvement in the education and training of elementary school teachers. A sum of Rs. 1,25,00,000 has been provided in the Fifth Five-Year Plan for teachers education and training. If the schemes recommended by the Committee is implemented from 1976-77 onwards, the additional expenditure over and above the sum of Rs. 1,25,00,000 provided for expenditure during the Fifth Plan period on elementary school teachers' education and school teachers' education and training programme as recommended by the Committee will be of the order of about Rs. 60,00,000. In view of the importance of the teachers' training programme for improvement of the quality of education on which the Committee has led so much stress to make the education job-oriented, there should be no difficulty in finding a sum of Rs. 60 lakhs by adjustment in the plan expenditure of the Education Department of the State Government.

13.37. Implementation of the vocational and technical education will no doubt require additional funds of some magnitude. These schemes are, however, to be implemented by not only the Education Department, but also by other departments—Department of Agriculture and Animal Husbandry, Department of Industries and Technical Education, Department of Labour and Employment and Department of Health and Family Planning. Each of these departments as well as Education Department has made provision for funds in the plan for the vocational and technical education for which it is responsible. It should be possible to implement the proposals recommended by the Committee in respect of technical and vocational education within the funds available to each department and by adjustment, wherever necessary but it will be necessary to co-ordinate the activities of all these departments in this respect. The proposed State Council for vocational education should be the co-ordinating agency.

13.38. So far as recommendations in respect of higher education are concerned, additional funds will be required for introduction of new courses at the degree and post-graduate degree levels and for introduction of correspondence and part-time courses. Additional funds provided in the plan for development of higher education can meet part of the expenditure. As mentioned by the Committee, the State Government has to spend a large amount on non-viable institutions. The Committee has recommended amalgamation of non-viable colleges with viable institutions. If this recommendation is implemented it will result in savings which can be utilised for introduction of some new courses. If a decision is taken to set up a separate institution for management development programmes, the expenditure required for setting up such an institute will be considered. In view of the large expenditure the Committee has recommended that a proposal for establishment of an institute of management should be taken up with the Government of India and in the mean time, a post-graduate course in management development programmes may be introduced in Ranchi University.

13.39. Implementation of the national policy of three-year degree course will no doubt cost money but this cost will not be in consequence of the recommendation of the Committee. The State Government has to provide funds for implementation of this national policy which it has accepted. However, if difficulties are experienced in providing funds within a short period, the three-year degree course may first be introduced for the special honours and general honours courses and the three-year degree course may be introduced for the general pass course after some time.

13.40. It will be necessary to provide adequate facilities in respect of accommodation (teaching and residential), laboratories, equipment, libraries, play-fields, students' welfare and other amenities for students and this will cost money. No information is available regarding the existing facilities in the educational institution and the additional facilities which are required for improvement in the quality of education. In the absence of such information it is difficult to estimate the cost of providing such facilities. There will be some improvement in respect of these facilities by implementation of the proposal of the Committee regarding amalgamation of the non-viable colleges. Also if the Committee's recommendation that no new college should be allowed to be set up and recognised unless it fulfils all the essential requirements is implemented new institutions with no or inadequate facilities will not be set up. The Committee recommends that a survey should be conducted regarding availability of facilities in the institutions imparting higher education. On the basis of the results of this survey, provision should be made to provide facilities on a phased basis.

CHAPTER XIV

MACHINERY FOR IMPLEMENTATION

14.1. *Machinery for implementation of the recommendations of the committee.*—The Committee has considered the question of implementation of the recommendations of the committee. Department of Education of the State Government and various Boards and Agencies under it will be mainly responsible for implementation of most of the recommendations of the committee. Besides the Department of Education, Departments of Industries and Technical Education, Labour and Employment, Agriculture and Animal Husbandry and Co-operation, and Health and Family Planning will be responsible for implementation of the recommendations of the committee in respect of technical and engineering education, vocational education, agricultural education, medical and para-medical education respectively.

14.2. *Machinery for implementation of recommendations in respect of vocational education.*—In order to co-ordinate the activities of these different departments of the State Government in respect of vocational and technical education for laying down the standard of education, conducting examinations, and for award of certificates and diploma, the Committee has recommended establishment of a State Council for vocational and technical education with a whole-time Chairman. In view of the importance of job-oriented education, it is necessary that the State Council on Vocational and Technical Education, as recommended by the Committee, should be set up without delay. The Committee has recommended, in some details, the constitution of the proposed State Council on Vocational and Technical Education. Implementation of this recommendation should be given high priority.

14.3. *Machinery for implementation of recommendations in respect of school education.*—The Committee has emphasised the importance of the school education and qualitative improvement of school education with a view to making it job-oriented and suitable as foundation for job-oriented higher education. The Director of School Education in the Education Department, Board of Secondary Education, Bihar School Examination Board, the State Institute of Science Education and the Institute of English Education, and Bihar Text-Book Corporation are all concerned with school education and its qualitative improvement. There is lack of co-ordination between these various agencies; each agency appears to function in isolation. In fact, many of these agencies are not very clear about their functions and the goals they have to achieve. The Committee has made recommendations regarding the constitution and the functions of State Council, Educational Research and Training, in which should be merged the three separate agencies—State Institute of Technical Education, State Institute of Science Education and Institute of English. The State Council of Educational Research and Training should be set up on the basis of recommendations of the Committee with a competent Director, as soon as possible.

14.4. The Board of Secondary Education, as at present constituted, is not an academic body; it functions largely as an administrative body. The Board has, no doubt, to discharge the administrative functions assigned to it, but its main objectives include, among others, laying down of standards of and bringing about improvement in the quality of school education. One and the same Board should look after the secondary education and higher secondary education (academic stream). Creation of too many Boards will lead to multiplication of agencies and lack of co-ordination. Not only should one and the same Board of Secondary Education look after secondary

and higher secondary education (academic stream), but it should co-ordinate the standards, syllabuses and the quality of primary and middle school education, because the syllabuses from classes I to X, as recommended by the Committee, should be continuous. The Board should not, however, be entrusted with the administrative aspects of primary and middle schools.

In order that the Board of Secondary Education may discharge the function it should be reconstituted with a whole-time Chairman who should have knowledge of and interest in school education and should have preferably experience of administration. Director of School Education and the representatives of the State Council of Educational Research and Training, Bihar School Examination Board, State Council of Vocational and Technical Education, Bihar Text-Book Corporation, three representatives of Headmasters/Principals and the teachers of the Secondary or Higher Secondary Schools, two representatives of the Universities in the State and two experts of School Education should be included. The Board should have committees including Academic Committees, Finance Committees, Executive Committees, Planning and Development Committee to look after different functions. The Chairman should have adequate powers to carry on day-to-day functions of the Board.

14.5. The Committee has recommended that Bihar School Examination Board should do much more in respect of examinations and evaluations than merely holding one annual and one supplementary school examination. It should carry on among other functions, research for examination reform, guide schools and school complexes in respect of internal evaluation, conduct experiments through pilot schemes for examination reform and maintain 'question bank'. Government may consider issue of directives to the School Examination Board asking it to undertake these functions.

Bihar Text-Book Corporation prepares, at present, books, prints and publishes them on the basis of approved syllabuses, of school education and in consultation with experts on different subjects. The committee has recommended co-operation between the Directorate of School Education, State Council of Educational Research and Training, the State Board of Secondary Education and the Bihar Text-Book Corporation for preparation of books and their publication.

14.6. The activities of these different bodies have to be co-ordinated by the Director of School Education. In order that the Director of School Education may effectively co-ordinate the activities of these various bodies in respect of the contents and the quality of school education, he or she should be assisted by capable Joint and Deputy Director(s) in the disposal of the business of directorate. A Co-ordinating Committee consisting of the heads of all these organisations with Director of School Education as convener should be set up. This committee should meet at least once in two months and deal with all common matters relating to the contents and quality of education and evaluations. It should be the responsibility of the Director of School Education to take all steps for implementation of the recommendations of the committee in respect of school education, but this committee should review the progress of implementation and suggest, if necessary, concrete steps, for quick and effective implementation of the recommendations.

14.7. *Machinery for implementation of recommendations in respect of teacher education and training.*—Training colleges for elementary schools are under the control of Director of Education. The Director of Education hardly finds any time to look after the qualitative aspects of teachers' training programme. In view of

great importance of teachers training programmes, it is necessary to have a Director of Teacher Education and Training. The Director of Teachers' Education and Training may be *Ex-officio* Director of the State Council of Educational Research and Training. He should be assisted by a Joint Director or a Deputy Director. It should be the responsibility of the Director/Joint Director of Training to implement the recommendations in respect of teacher education and teachers' training programme in co-operation with the State Council of Educational Research and Training in respect of elementary school teachers' education and training programme and in co-operation with the university authorities.

14.8. *Machinery for implementation of the recommendations in respect of higher education.*—Implementation of the recommendation in respect of degree and post-degree under-graduate and post-graduate courses in various institutions will be mainly the responsibility of the university authorities. It is, however, necessary that a Co-ordinating Body with Minister of Education as Chairman, Vice-Chancellors and the Chairman of the Committee as members and Education Commissioner as Member-Secretary should be set up for this purpose. It should meet at least once in a quarter.

14.9. *Association of Chairman of the Committee with the machineries for Implementation.*—The Chairman of the Job-Oriented Education Committee may be associated with the State Council of Vocational and Technical Education as well as with the Co-ordinating Committee for the Universities as already suggested. In addition, if a university wants the assistance of the Chairman or any member of the committee in the matter of job-oriented courses it may do so.

14.10. *Creation of a cell in the departments of education for overall action for implementation and review.*—A committee consisting of Education Commissioner Chairman of the Committee, Director of Higher Education, Director of School Education as members and competent Deputy Secretary or a Deputy Director of Education as Member-Secretary should be set up at the Secretariat level to initiate action for implementation through various agencies as discussed in the foregoing paragraphs, for obtaining orders of Government for implementation, wherever necessary and for reviewing the progress of implementation. It should meet at least once a month.

CHAPTER XV

GENERAL OBSERVATIONS

15.1. In considering the important objectives and strategies of job-oriented education in Chapter I of the report we expressed the view that education should be related to the social and economic needs of and activities in the State. While analysing the existing educational system of the State we came to the conclusion that the present educational system, and, particularly the higher education is not related to the social and economic needs of the State. We also expressed the view that there is considerable wastage of efforts and money at various levels of education because of inefficiency of the educational system and low standard of and lack of co-ordination between the educational system and the social and economic activities.

15.2. Another important objective of the educational system, as mentioned in paragraph 1.33 of the report, is its contributions to modernisation of society and various productive processes. We have made our recommendations for achieving these objectives in the context of the existing political, social and economic system obtaining in the State and the country and the existing social and economic activities and those planned for and projected in the foreseeable future.

15.3. Although education is necessary for progress and modernisation, it is not sufficient by itself to achieve them. Education can be of use, if the social and economic institutions required for modernisation and progress are also set up and necessary efforts are made for economic and social development. Educational efforts in countries which are now developed have been preceded or accompanied by development of political, social and economic institutions with the objective of increasing production and productivity and the creation of conditions for development. For example, the U.S.A., Japan and the U.S.S.R. have developed political, social and economic systems and institutions which they consider suitable for themselves, worked very hard for their economic development and social progress and developed education to support them and develop them further.

15.4. Our analysis of the educational system of the State has shown that the educational system of the State has not been planned adequately for directing practical efforts with the result that ill-equipped and ill-staffed educational institutions have come into existence in large number and the quality of education has deteriorated and education imparted to large number of young people are of no practical use to them. It is easier to set up educational institutions with little or no investment than to change traditions which hamper modernisation and production or to deny to the present generation the enjoyment of current income and invest it in agriculture, industries, trade and other productive processes for economic development. Such an attitude cannot, however, solve the problem of poverty, stagnation and unemployment. Unless the quality of education improves, it cannot be expected to make contributions to modernization and progress.

15.5. Some of the existing social values in the State like narrow loyalty to kith and kin, caste and village as partitions and lack of scientific attitude hamper not only modernization and progress but also efforts for improvement in the quality of education. Such values have to be replaced by wider loyalty to the State and the country and commitment to the social goals and inculcation of scientific spirit.

15.6. For proper development of education there should be right 'social climate'. Right 'social climate' should include high priority and urge for technology, skills and

attitude which are required for increasing production and productivity and thereby the net domestic product. It also includes respect and prestige for those who are educated and who make worthwhile contributions to the economic, social and cultural activities by their skill, ability and power of mind. It further includes general education of a minimum level for the general public because it (education) shapes their attitude to the social goals and the efforts required to attain those goals.

15.7. It is necessary to create necessary material base for sustaining a proper level and quality of education. Unless a proper material base by increase in production and productivity is created, it will not be possible to find adequate funds for educating the growing population of the State and the country, nor will it be possible to bring about improvement in the quality of education. It will not also be possible to provide opportunities for gainful employment to the educated young people. A rich country has to have a high level of education to sustain its economy and for further progress and development, but a poor country can neither financially support such a high level of education, nor can it provide suitable jobs for persons educated in large numbers. It is, therefore, necessary to create adequate material base in the State for sustaining an adequate level of education for which there will be increasing demand and which will be required for sustaining and developing the material base.

15.8. We have to create the necessary material base and economic and social institutions for removal of poverty and raising standard of living and plan development of education so that it contributes to the economic development and social progress. This will require high level of organisation, managerial ability and quality of leadership, hard and sustained labour, discipline and last but not the least good quality of education. Without economic development and social progress no amount of change manipulation in the educational system and structure will be able to solve the problems of poverty and unemployment of educated or even uneducated persons. There are no soft options.

15.9. The quality of education at all levels is of very great importance. Cheap educational degrees and certificates acquired by some means or the other can lead the State and the country nowhere and will be of no use to the holders of such degrees and diplomas, if the economic and social activities of the State and the country cannot provide jobs to them. Holders of such cheap degrees cannot be expected to make useful contributions to economic development and social progress even if they are somehow or other provided with jobs. The Committee has led very great stress on improvement of the quality of education at all levels in the hope that education will turn out leaders, organisers, managers, professional, technical and skilled persons, teachers, etc., required for economic development and social progress which alone can create jobs for absorption of educated young people who join the labour market every year.

Shri Ramanand Sinha—*Chairman.*

Members

1. Shri S. C. Roy, Development Commissioner, Bihar, Patna.
2. Dr. R. C. Mehrotra, Vice-Chancellor, University of Delhi, Delhi-7.
3. Acharya D. N. Sharma, Ex-Vice-Chancellor, Patna University, Patna.
4. Dr. S. K. Mukherjee, Vice-Chancellor, Rajendra Agriculture University, Pusa (Samastipur), Bihar.
5. Dr. Y. K. Sinha, Joint Director (ME), Health Services, Bihar, Patna.
6. Dr. Gopal Tripathy, Senior Professor and Director, Plan Co-ordination and Research Evaluation, Banaras University, Varanasi.

7. Dr. J. P. Chondhary, Director, Technical Education, Industries Department, Bihar, Patna.
 8. Shri Deonarain Sinha, Ex-Principal, Patna Training College, Patna University, Patna.
 9. Mrs. R. Nandi, Former Director of Education (Higher), Bihar, Patna.
 10. Shri B. P. Singh, Director, Agricultural Education, Bihar, Patna.
 11. Shri Ramanand Prasad, Director, Employment and Training, Bihar.
 12. Dr. R. P. Singh—*Secretary*.
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ANNEXURE I

Additional cost on Elementary School Teachers' Education and programmes recommended by the Job-Oriented Education Committee

Existing staffing pattern 'A'	Proposed pattern 'B'
1. One Principal in class II, B.E.S. (Rs. 510—25—610—30—670—E.B.—30—910—E.B.—35—1,155)	1. One Principal in class II, B. E. S. (Rs. 510—25—610—30—670—E. B.—30—910—E.B.—35—1,155 +150 as special pay)
2. 3 Lecturers in U. D., S. E. S. (Rs. 415—15—565—E. B.—20—745)	2. 3 Lecturers in Junior class II, B.E.S. (Rs. 455—15—500—E. B.—20—740—E. B.—25—840)
3. 6 Lecturers in L. D., S. E. S. (Rs. 387—13—465—E. B.—15—600)	3. 6 Lecturers in U. D., S. E. S. (Rs. 415—15—565—E. B.—20—745)
Principal @ Rs. 910 p. m.	Principal @ Rs. 910 + 150 special pay
3 Lecturers @ Rs. 625 p. m.	3 Lecturers @ Rs. 790 p. m.
6 Lecturers @ Rs. 510 p. m.	6 Lecturers @ Rs. 625 p. m.
Cost per year Rs. 70,140	Cost per year Rs. 86,160.

Additional amount required—(Rs. 86,160—Rs. 70,140) = Rs. 16,020

Additional amount for 84 Primary Teachers' Education

College Rs. 16,020 × 84 = Rs. 13,45,680 per year

or Rs. 13,46,000 in round figures.

NON-RECURRING EXPENDITURE

	Rs.
(i) For accomodation (Rs. 1,00,000 per college on the average	84,00,000
(ii) For playground (for acquisition of land @ Rs. 10,000)	8,40,000
(iii) For library @ Rs. 5,000 each	4,20,000
(iv) For Laboratory @ Rs. 50,000 each	42,00,000
(v) For teaching aids @ Rs. 5,000 each	4,20,000
	1,42,80,000

ANNEXURE II

1. Name of the Company—C. M. A. L's Central Division (N. C. D. C. Ltd.)
2. Number of Managers in the organisation as on 1st April 1974 and the estimated further requirements in the following categories up to 1979.

Categories of Managers.	Junior level		Middle level		Senior level		Top level.		Total.	
	Pre-sent.	1979.	Pre-sent.	1979.	Pre-sent.	1979.	Pre-Sent.	1979.	Pre-sent.	1979.
1. Mechanical Engineer (Excava) ..	58	308	43	105	4	6	1	2	106	421
2. Electrical Engineer ..	67	263	39	87	4	5	1	1	111	356
3. Civil Engineer ..	23	86	17	44	..	2	1	1	41	133
4. Mining Engineer ..	233	828	119	266	19	25	2	3	373	1,122
5. Metallurgical Engineer ..	..	..	..	..	..	..	..	..	..	..
6. Chemical Engineer ..	..	..	2	2	2	..	..	..	2	2
7. Electronical Engineer ..	..	..	..	..	..	..	..	..	..	..
8. Any other area of Engineering (washery) ..	11	34	20	32	2	4	..	..	33	70
9. Marketing and Sales ..	6	..	9	..	1	..	1	..	17	..
10. Purchase, Inventory, Inventory and Meterial Management.	16	35	16	24	1	1	..	1	33	61
11. Financial:—										
(i) Cost accountant ..	24	55	17	34	..	1	..	..	41	90
(ii) Chartered accountant ..	4	10	3	9	3	5	1	1	11	25
12. Personnel ..	25	48	26	54	1	2	..	1	52	105
13. General Management ..	86	316	29	93	1	2	2	2	118	413
TOTAL ..	621	2158	272	575	36	53	9	12	938	2,798

3. Of the 1979 requirements, approximately 1,070 numbers are likely to be available from within.

ANNEXURE III

*Requirement of non-managerial technical personnel up to 1978-79 in N.C.D.C. Ltd.
(Central Division of C.M.A.L.)*

EXCAVATION TRADE

Foreman Incharge (Mechanical)	...	...	38
Foreman Incharge (Electrical)	...	...	17
Foreman (Mechanical)	...	...	50
Foreman (Electrical)	...	...	28
Chargeman (Mechanical)	...	...	24
Chargeman (Electrical)	...	...	16
Foreman Trainee (Mechanical)	...	...	48
Foreman Trainee (Electrical)	...	...	56

NON-EXCAVATION TRADES INCLUDING UNDERGROUND COLLY. WORKSHOPS AND WASHERIES

Foreman Incharge (Mechanical)	...	...	57
Foreman Incharge (Electrical)	...	...	49
Foreman (Mechanical)	...	...	44
Foreman (Electrical)	...	...	56
Chargeman (Mechanical)	...	...	36
Chargeman (Electrical)	...	...	53
Foreman Trainee (Electrical)	...	...	42
Foreman Trainee (Mechanical)	...	...	43
Foreman Trainee	}	...	339
Senior Head Overman Overman			
Mining Sirdar Grade I	}	...	698
Mining Sirdar Grade II			
Shot Firers			

MINE SURVEY PERSONNEL

Head Surveyor	...	...	9
Surveyors	...	...	66
Deputy Surveyors	}	...	54
Assistant Surveyors			

DRAWING OFFICE PERSONNEL

Chief Draughtsman (Civil and Structural)	...	...	5
Senior Draughtsman	...	...	10
Draughtsman/Junior Draughtsman	...	...	10
Assistant Draughtsman-cum-Tracer	...	...	15
Tracer	...	...	12

ESTIMATING PERSONNEL

Chief Estimator	...	...	...	...	3
Senior Estimator	...	...	...	...	3
Estimator	...	...	...	...	3

SUBORDINATE TECHNICAL STAFF OF CIVIL ENGINEERING DEPARTMENT

Engineering Assistant	...	...	...	...	18
Head Surveyor (Civil)	...	...	...	...	10
Surveyors (Civil)	...	...	...	...	10
Surveyors (Civil)	...	...	...	...	10
Overseer (Civil)	...	...	...	...	25
Draughtsman Surveyor	...	...	...	...	14
Inspector of Works	...	...	...	...	7

HEAVY BLASTING PERSONNEL

Foreman Incharge (Blasting)	...	...	...	...	9
Foreman (Blasting)	...	...	...	...	15
Chargeman (Blasting)	...	...	...	...	18

PRINTING PRESS

General Foreman	...	...	...	...	1
Assistant Foreman	...	...	...	...	2
Chargeman	...	...	...	...	3
Compositor	...	...	...	...	7
Distributor	...	...	...	...	3
Mono Caster	...	...	...	...	2
Machineman	...	...	...	...	10
Assistant Machineman	...	...	...	...	7
Section Holder (Book Binding)	...	...	...	...	23

CATEGORY IV

Electrical Fitter/Electrician	...	...	...	...	150
Fitter Mechanical	...	...	...	...	288
Lamp Fitter	...	...	...	...	45
Blacksmith	...	...	...	...	58
Carpenters	...	...	...	...	21
Colly. Workshop Machinist	...	...	...	...	18
Drillers	...	...	...	...	101
Haulage Khalasi	...	...	...	...	128
Scraper/Shusher/Dragline Khalasi	...	...	...	...	5
Winding Engine Khalasi	...	...	...	...	10
Loco Driver	...	...	...	...	12
Conveyor Fitter	...	...	...	...	47

CATEGORY III

Pump Khalasi	...	...	...	...	405
Haulage Khalasi	...	...	...	...	234
Compressor Khalasi	...	...	...	...	12
Conveyor Khalasi	...	...	...	...	192

CATEGORY V

Haulage Khalasi	...	...	...	...	17
Loco Driver	...	...	...	...	19
Winding Engine Khalasi	...	...	...	...	12
C. C. M. Drivers	...	...	...	...	131
Fitters (Mechanical)	...	...	...	...	111
Fitters (Electrical)/Electrician	...	...	...	...	131
Lap Fitter	...	...	...	...	39
Colly Workshop Machinist	...	...	...	...	12
Welder Grade II	...	...	...	...	17
Machineman Grade II	...	...	...	...	20
Turner-cum-Latheman Grade II	...	...	...	...	9
Boring/Milling Machine Operator Grade II	...	...	...	...	13
Fitter Grade II	...	...	...	...	31
Pattern Maker Grade II	...	...	...	...	7
Carpenter	...	...	...	...	23
Moulder Grade II	...	...	...	...	16
Electrician Grade II	...	...	...	...	16
Armature Winder Grade II	...	...	...	...	5
Motor Mechanic Grade II	...	...	...	...	8
Blacksmith Grade II	...	...	...	...	21
Tinsmith/Plumber Grade II	...	...	...	...	2

CATEGORY VI

C.C.M. Drivers	...	...	...	...	132
Mechanical Fitter	...	...	...	...	115
Electrical Fitter/Electrician	...	...	...	...	129
Colly. Workshop Machinist	...	...	...	...	13
Turner/Latheman Grade I	...	...	...	...	10
Boring/Drilling Machine Operator Grade I	...	...	...	...	7
Fitter Grade I (Workshop)	...	...	...	...	15
Pattern Maker Grade I	...	...	...	...	8
Moulder Grade I	...	...	...	...	12
Armature Winder Grade I	...	...	...	...	5
Motor Mechanic Grade I	...	...	...	...	11
Blacksmith Grade I	...	...	...	...	19
Welder Grade I	...	...	...	...	19

EXCAVATION TRADES : OPERATORS

Heavy Dragline Operator	...	...	...	10
Excavator Operator Grade I	...	...	...	75
Crane Operator Grade I	...	...	...	14 (14)
Drill Operator Grade I	...	...	...	30
Tractor/Dozer Operator	...	...	...	54
Excavator Operator Grade II	...	...	...	10
Crane Operator Grade II	...	...	...	4
Dumper Operator Grade I	...	...	...	94
Scraper Operator	...	...	...	4
Drill Operator Grade II	...	...	...	14
Dumper Operator Grade II	...	...	...	48
Dumper Operator Grade III	...	...	...	27
Excavator Operator Grade III	...	...	...	4

TECHNICIANS

E. P. Senior Mechanic	...	...	...	17
E. P. Electrician Grade II	...	...	...	18
E. P. Turner Grade I	...	...	...	10
E. P. Welder Grade I	...	...	...	14
E. P. Machinist Grade I	...	...	...	5
E. P. Mechanic-cum-Fitter Grade I	...	...	...	36
E. P. Electrician Grade II	...	...	...	13
E. P. Fitter Grade II	...	...	...	20
E. P. Welder Grade II	...	...	...	17
E. P. Machinist Grade II	...	...	...	10
E. P. Turner Grade II	...	...	...	4
E. P. Electrician Grade III	...	...	...	19
E. P. Fitter Grade III	...	...	...	85
E. P. Welder Grade III	...	...	...	18
E. P. Turner Grade III	...	...	...	11
E. P. Machinist Grade III	...	...	...	13

ANNEXURE IV

Persons, organisations, institutions and individuals who appeared before the committee or/and who submitted their views in writing.

STATE GOVERNMENT REPRESENTATIVES.

Shri C. P. Singh, Director, Employment and Training, Labour Department, Bihar, Patna.

Shri G. S. Shrivastava, Director of Training, Labour Department.

Shri Madan Gopal, Joint Director, Training, Labour Department.

Shri R. B. Prasad, Deputy Secretary, Department of Industries and Technical Education.

Shri K. P. Sinha, Education Commissioner, Bihar.

Shri A. P. Shrivastava, Director, Secondary Education.

Dr. Jaidev, Principal, Zila School, Saharsa.

Shri U. N. Sinha, Youth Welfare Services and Sports, Education Department.

Shri Uma Prasad Sinha, Deputy Director I/C of State Education.

Dr. Devendra, Director, Institute of Science, Patna.

Shri T. K. Shrivastava, Lecturer, State Institute of Science, Education, Patna.

Shri Bishwanath Prasad, I/C Institute of English, Patna.

Shri A. K. N. Hasan, Managing Director, Area Development Authority, Bokaro.

Shri C. B. Prasad, Managing Director, Area Development Authority, Ranchi.

BHARAT COKING COAL, LTD., DHANBAD.

Shri R. N. Sharma, Chairman and Managing Director.

Shri Mahipatti, Director (Personnel).

Shri C. S. Jha, Director (Technical).

Shri U. K. Choubey, Chief Personnel Manager.

BIHAR INSTITUTE OF TECHNOLOGY, SINDRI

Dr. K. P. Gupta, Director

Dr. B. P. Sinha.

Dr. S. K. Singh.

Prof. I. D. P. Singh.

Shri M. Sinha.

Prof. M. N. Banerjee.

Dr. C. P. Sinha.

Prof. S. N. Sinha.

Dr. G. P. Singh (Principal, M. I. Bhaga).

PLANNING AND DEVELOPMENT DIVISION, F.C.I., LTD.

Shri D. G. Rao, Group Manager.
 Shri J. Lal, Personnel Manager.
 Fertilizer Corporation of India, Sindri Unit.
 Shri S. R. Pandey, G. P. M.
 Shri K. N. Mahaseth, Training Officer.

TELCO, JAMSHEDPUR.

Shri H. S. Verma, Chief Personnel Manager
 Shri P. K. Lal, Personnel Manager.
 Shri K. C. Mazumdar, Dy. G. M.
 Shri S. N. Ghosh, Manager, Personnel

TISCO, JAMSHEDPUR.

Shri D. N. Budhanwala, General Manager and Director.
 Shri Kumár Taranand Sinha, Resident Representative
 Shri B. V. Petkar, Superintendent of Training.
 Shri D. P. Kharia, General Superintendent.
 Shri F. S. Tarapore, Director of Project.
 Shri M. M. Sinha, Chief Mechanical Engineer
 Shri N. P. Naik, Divisional Manager.

XAVIER LABOUR RELATIONS INSTITUTE.

Shri N. Mukherjee, Registrar.
 Mr. E. H. Megrath, S. J.

COA5-MINES AUTHORITY AND NATIONAL COAL DEVELOPMENT CORPORATION, RANCHI.

Shri K. Ranganathan, Sr. Executive Engineer (Excavation).
 Shri K. K. Ramaiah, Superintending Engineer (E. & M.).
 Shri P. N. Kakar, Addl. C.M.E.(P).
 Dr. S. N. Prasad, Dy. C.M.E., CMPDI.
 Shri M. N. A. Rao, Design Engineer (P).
 Shri K. Roy, General Manager. C.M.P.D., (C.M.A. Ranchi).

BIRLA INSTITUTE OF TECHNOLOGY, MESRA.

Prof. B. R. Seth, Director.
 Dr. H. C. Pandey, Deputy Director. B.I.T., Mesra, Ranchi.

MECON.

Shri K. C. Mohan, Managing Director, Mecon.
 Shri Kurian, Chief Engineer, Mecon.
 Dr. Pramanik, Chief Engineer, Mecon.

HEAVY ENGINEERING CORPORATION.

Major General Kini, Managing Director, H. E. C.
 Shri C. K. Bhattacharjee, Chief of Administration, H. E. C.
 Shri S. Singh, Personnel Department, H. E. C.

INDIVIDUALS.

Shri Himanshu Bhushan Prasad Sinha, Department of Mathematics, Patna College.
 Shri Hemdhar Narayan Sinha, U.G.C Research Fellow, Department of Education, Patna University.
 Shri Jagdish Prasad Sharma, Department of Education, Patna University.

PATNA UNIVERSITY TEACHERS ASSOCIATION.

Dr. G. P. Sinha, Head of the Department of Labour and Social Welfare and President, PUTA.
 Prof. S. K. Bose, Principal, B. N. College and Vice-President, PUTA.
 Dr. H. P. Sinha, Secretary, PUTA.

FEDERATION OF UNIVERSITY TEACHERS ASSOCIATION.

Dr. S. N. Choudhary.
 Prof. Ekram Sabnam.

BIHAR SECONDARY TEACHERS ASSOCIATION.

Shri B. Mishra, President.
 Shri C. P. Singh, Secretary.

REPRESENTATIVES OF SIRSHAK SANGH, BIHAR ASSOCIATION OF PRIMARY AND MIDDLE SCHOOL TEACHERS.

Shri Jagdish Mishra, General Secretary.
 Representatives of Bihar State Science Teachers Association.

RANCHI UNIVERSITY.

Shri R. S. Mandal, Vice-Chancellor.
 Dr. Manoranjan Pd. Gupta, Head of the Physics Department.
 Dr. Harishchandro Mishra, Head of the Chemistry Department.
 Dr. Kartikchandra Bose, Head of the Zoology Department.
 Dr. Jwala Pd. Singh, Head of the Botany Department
 Dr. Krishna Murari Saxena Head of the Mathematics Department.
 Dr. Bamanath Jha, Head of the English Department
 Dr. Ram Khelawan Pandey, Head of the Hindi Department.

Dr. Inayat Ahmad, Head of the Geography Department.
 Dr. Ramashankar Shrivastava, Head of the Philosophy Department.
 Shri Dinesh Prasad Pandey, Head of the Sanskrit Department.
 Dr. Jagdish Chandra Pathak, Representative from Geology Department.
 Shrimati Bhanumati Prasad, Principal, Ranchi Training College.
 Dr. P. Raghuraj Sharan, Principal, Tata College, Chaibasa.
 Dr. Yamuna Prasad Pandey, Doranda College, Ranchi.
 Father Devener, Representative, St. Xavier College.
 Shri Baldeva Prasad, Student Representative. Physics Department.
 Shri Dinesh Prasad Verma, Registrar, Ranchi University.
 Dr. Umesh Chandra, Head of the Department of Geology, Ranchi University.
 Dr. Fanindra Nath Ojha, Head of the Department of History, R.U.
 Dr. Ram Niranjana Tripathi, Head of the Department of Economics, R.U.
 Dr. Jainarayan Mandal, Head of the Department of Hindi.
 Heads of the Departments of Urdu, Bengali and Oriya.
 Shri S.N. Singh, District Education Officer, Ranchi.
 Shri Rajeshwar Prasad, Principal, Government Polytechnic.
 Shri Awadh Bihari Lal Verma, Regional Assistant Director of Education, East Ranchi.
 Smt. M. Ghosh, Headmistress, Chotanagpur Girls High School, Ranchi.
 Shri Nandlal Singh, Teacher, Government Girls High School, Ranchi.
 Shri Charles Sorang, S.J. Principal, St. Johns High School, Ranchi.
 Shri Sadanand Shrivastava, Lecturer, Teachers Training College, Ranchi.

BIHAR CITIZENS COUNCIL.

Dr. B. Prasad, Ex-V.C., Patna and Allahabad Universities.
 Dr. A. K. Sen.
 Dr. Surendra Gopal.

PRINCIPALS AND PROFESSORS OF ENGINEERING COLLEGES AND POLYTECHNICS IN BIHAR.

Prof. D.N. Singh, Principal, Bihar College of Engineering, Patna.
 Prof. S. Prasad, Principal, M.I.T., Muzaffarpur.
 Prof. Dr. K. P. Gupta, Director, B.I.T., Sindri, Dhanbad.
 Dr. B. R. Seth, Director, B.I.T., Mesra, Ranchi.
 Dr. H. C. Pandey, Deputy Director, B.I.T., Mesra, Ranchi.
 Prof. R. Prasad, Head of the Department of Metallurgical Engineering, Sindri Institute, Dhanbad.
 Prof. P. Bhaskaran, Prof. of Electronics, Sindri Institute, Sindri.
 Prof. R. K. Garg, Engineering College, Bhagalpur.
 Sri R. Prasad, Government Polytechnic, Gaya.
 Sri R. Prasad, Government Polytechnic, Ranchi.
 Sri S.K. Ganguli, Principal Government Polytechnic, Gaya.
 Sri R. K. Gupta, Principal, New Government Polytechnic, Patna-13.

Sri K. G. Chonbey, Principal, Government Polytechnic, Gulzarbagh, Patna-7.
 Dr. K.N.P. Sinha, Principal, Mining Institute, Dhanbad.
 Prof. S.N. Sinha, Prof. of Mechanical Engineering, Sindri Institute, Sindri.

TEACHERS OF THE PATNA UNIVERSITY.

Dr. V.N. Singh, Deen Students Welfare.
 Dr. L.S. Singh, University Prof. of Physics.
 Dr. S.P. Ghosh, University Prof. of Chemistry.
 Dr. D.N. Lal, University Prof. of Statistics.
 Dr. B. De, University Prof., Psychology.
 Dr. R.R. Singh, University Prof., Education.
 Prof. D. Jha, University Prof. of Economics.
 Prof. A. Mishra, University Prof. of Maithili.
 Dr. R.C. Hingoroni, Head of Law Department.
 Dr. B.P. Sinha, Head of Ancient Indian History and Archæology.
 Dr. S.A.A. Kazimi, Head of Arabic Department.
 Prof. S.K. Bose, Principal, B. N. College.
 Sri N.K. Chaudhary, B. N. College.
 Sri S.M. Safruddin, Head of the Urdu Department, Patna University.
 Dr. R.K.P. Singh, Head of the Mathematics Department, Patna University.
 Dr. S.N. Das, Principal, Science College, Patna-5.
 Sri Ramjatan Singh, Chemistry Department, Patna University.

STUDENT REPRESENTATIVES.

Sri Narendra Kumar Singh, Representative, Patna Engineering College.
 Sri Vishwa Ranjan Verma, Vth Year Physics.
 Sri Bibhash Chandra Sinha, Vth Year Physics Department.
 Sri Rabindra Kumar, VIth Year Physics Department.
 Sri Gopal Kamal, VIth Year, Physics.
 Sri Naresh Sharma, VIth Year, Department of Statistics.
 Sri Prafulla Mohan Sinha, Vth Year Geology.
 Sri Manoj Kumar, VIth Year. Department of Applied Economics and Commerce.
 Sri Tapan Kumar Ghosh, Applied Economics and Commerce Department.
 Sri Birendra Prasad Singh, VIth Year Political Science.

RAJENDRA AGRICULTURAL UNIVERSITY, BIHAR.

Prof. S.K. Mukherjee, Vice-Chancellor, Rajendra Agricultural University, Pusa
 (Samastipur), Bihar.
 Principals and Professors of Agricultural College, Dholi (Bihar).

OTHERS.

Sri J.P. Naik, Member-Secretary, N.C.R.T. and Member-Secretary, Central Advisory Board of Education.

Dr. L.K. Mishra, Chairman, Bihar School Examination Board, Patna.

Dr. Sachidanand, Director, A.N. Sinha Institute of Social Studies, Patna.

Dr. Pradhan Harishankar Prasad, Prof. of Economics, A.N. Sinha Institute of Social Studies, Patna.

Sri Surendra Prasad, Managing Director, Bihar State Text-Book Publishing Corporation.

ANNEXURE V.

Meetings of the Committee held at places other than at Patna.

1. Sindri.
2. Dhanbad.
3. Jamshedpur.
4. Ranchi.

Meetings of the Committee held at Patna.

1. 14th September, 1974.
2. 21st September, 1974.
3. 14th and 15th October, 1974.
4. 25th and 26th November, 1974.
5. 16th and 17th December, 1974.
6. 20th and 21st January, 1975.
7. 22nd February, 1975.
8. 3rd March, 1975.
9. 12th April, 1975.
10. 16th May and 17th May, 1975.
11. 14th July, 1975.

ANNEXURE VI.

Staff working in the Committee

1. Shri A. K. Mukherjee, P. A.—Till March, 1975.
2. Shri Ram Lakhan Prasad, P. A.—From 13th September, 1975.
3. Shri Nand Kishore Prasad, Assistant—Till May, 1975.
4. Shri Sukesh Kumar, Assistant.—From April, 1975.
5. Shri Ganga Prasad Shrivastava, Typist.
6. Shri Bir Prakash Gupta, Typist.
7. Shri Bhuvaneshwar Yadav, Peon.
8. Shri Ganesh Ram, Peon.
9. Shri Shahabuddin, Peon.
10. Shri Punit Yadav, Peon.

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