

Manpower Studies—16.

SCIENTISTS IN INDIA

A Statistical Study

Scien: July 1959

PLANNING COMMISSION
PERSPECTIVE PLANNING DIVISION

Manpower Studies - 16

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Acknowledgment

This Report is a statistical study of Scientists in India, and brings together the results of a number of studies conducted in the Scientific and Technical Manpower Section of the Perspective Planning Division in 1958-59, working in collaboration with the Planning Unit of the Indian Statistical Institute. The material of earlier studies (viz., Manpower Studies, Numbers 6, 7, 11 and 12 issued in a mimeographed form by the Division) has been utilised together with additional data since compiled, to prepare a compact Report.

Shri M.S. Pandalai of the Indian Statistical Institute, compiled the new material on mathematicians and statisticians and took much pains to organise the scattered information in comparable form.

The cooperation of the National Register Unit of the CSIR is gratefully acknowledged.

31st July 1959.

Pitambar Pant

SCIENTISTS IN INDIA

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CHAPTER ONE

1.1 Introduction: This Report presents the results of a study on resources of scientific manpower in India, made by the Scientific and Technical Manpower Section in the Perspective Planning Division of the Planning Commission in collaboration with the Planning Unit of the Indian Statistical Institute at New Delhi, and the National Register Office of the Council of Scientific and Industrial Research.

1.2 The main data for the analysis were derived from the National Register of Scientific and Technical Personnel, which was started in 1948 under the auspices of the Council of Scientific and Industrial Research. The Register seeks to maintain upto date information regarding scientists and technologists on a card index system in the National Register Office of the Council, based on particulars supplied by the individual scientists on a prescribed form.

2. Object of the study: The present study was undertaken with a view to -

- (a) make an estimate of the total number of scientists in India at the end of 1955¹;
- (b) examine the coverage of the National Register of Scientific and Technical Personnel in relation to the estimates of the total number of scientists under different categories; and
- (c) analyse the information available in the Register in respect of age, qualification, specialisation, employment, functions, and salaries of scientists in India.

3. It was decided to limit the study as of the year 1955, since it was found that the largest proportion of the registrants had either registered or corrected their earlier registration as of the second half of 1955.

¹ For definition of 'scientist', see para 6.1 of Chapter Two.

CHAPTER TWO

Sources of Data and Definitions

4.1 Sources of Data : The data utilised in this study were derived from -

- (a) the Annual Reports and Calendars of the Indian Universities; and
- (b) the National Register of Scientific Personnel.

4.2 Annual Reports and calendars of Indian Universities : Figures of annual outturn of 'scientists' in India were collected from the Annual Reports and Calendars of the Indian Universities and formed the basis for arriving at an estimate of the total number of scientists in India towards the end of 1955.

4.3 National Register of Scientific and Technical Personnel : Detailed particulars of all scientists enrolled in the National Register are maintained on cards, one for each individual, in the National Register Unit of the Council of Scientific & Industrial Research in New Delhi. Information collected from these cards provided the material on which detailed analysis of age, specialisation, sector of employment, function, salary etc. of scientists is based. A brief description of the National Register follows.

5.1 The National Register : The National Register of Scientific and Technical Personnel owes its origin to a recommendation of the Scientific Manpower Committee appointed by the Government of India in 1947. The Committee had suggested that it would be useful to compile a National Register of Scientific and Technical Personnel to serve as a Directory of Scientific and Technical Personnel in the country and to provide a basis for improved utilisation of specialised personnel for national development. The recommendation of the Committee was accepted by Government, and the responsibility for the compilation of a National Register on the lines recommended by the Committee was entrusted to the Council of Scientific and Industrial Research.

5.2 The Council of Scientific and Industrial Research started the work of compilation of the National Register early in 1948. Information for the Register was obtained from scientific and technical personnel through questionnaires designed for the purpose and periodically issued to institutions and individuals who were requested to send the completed forms to the Secretary of the CSIR. The Office of the CSIR is in touch with the heads of scientific and technical organisations and professional societies, Government departments, industries in the public and the private sector, universities etc., and seeks to enlist their cooperation in getting the questionnaire forms filled by technical persons in their employment. With regard to the unemployed persons, the Employment Exchanges request scientific and technical candidates registering with the Exchanges fill in the National Register forms which are then forwarded by the exchanges.

5.3 The minimum qualification prescribed for inclusion of names in the National Register was a Bachelor's Degree in Science, a Diploma in Engineering or a Diploma in Medicine. The particulars called for are as follows:

- (1) Name
- (2) Address - (a) present; (b) permanent
- (3) Date of birth
- (4) Degrees, diplomas (with years, subjects and Universities); and nature of publication, if any.
- (5) Connections with Scientific Societies, Learned Bodies, Professional Associations etc.
- (6) Names of institutions where practical training was received.
- (7) Particulars of experience and employment -
 - (a) past experience of service;
 - (b) present nature of work;
 - (c) present designation and basic salary;
 - (d) nature of employment. Government/semi-Government/private etc.
- (8) Subjects in which he considers himself specialist
- (9) Any other relevant information about himself.

5.4 The efforts of the CSIR received an impetus by the public appeal for cooperation in this undertaking issued by the Prime Minister in December 1947, and within a few months the filled in forms started coming.

5.5 On the basis of the information thus collected the National Register of Scientific and Technical Personnel was compiled in three volumes, comprising eight parts, as shown below:

Volume I : 3 Parts : comprising Engineers, classified as Civil, Electrical, Mechanical, Mechanical - Electrical, Chemical, Marine, Mining, Aeronautical, Automobile and Communication.

Volume II : 3 Parts : comprising Medical Personnel, as Medical Graduates, Medical Licentiates and Dentists.

Volume III : 2 Parts : comprising Scientists and Technologists working in various scientific fields, such as Mathematics and Statistics, Physics, Meteorology, Chemistry, Geology and Mineralogy, Metallurgy, Anthropology, Botany, Zoology and Entomology, Agricultural & Horticultural, Plant Breeding and Genetics, Plant Pathology, Animal Husbandry and Dairying, veterinary Science and Forestry.

5.6 In respect of each individual listed in the Register, the following details were given: name; year of birth; academic and professional qualifications (with year of passing examinations of Institutions, where available), brief particulars of practical experience, present and permanent address, and a code to designate the employment sector, such as, Government, industry, teaching etc.

5.7 Upto 1955 the information collected was printed and published in three volumes, details of which are given below :

	<u>month and year of publication</u>	<u>number of persons included</u>
Volume I - Engineers		
Part I	August 1949	3600
Part II	October 1950	4600
Part III	December 1951	3776
Volume II - Medical Men		
Part I	March 1950	4072
Part II	April 1951	4728
Part III	July 1954	5650
Volume III - Scientists & Technologists		
Part I	April 1952	4691
Part II	May 1953	9221

5.8 Subsequently, in view of the changing nature and growing volume of the information and the difficulty of keeping it upto date enough to be of real value, it was considered that the expenditure of time

and money in bringing out further volumes of this type would not be commensurate with any advantages to be gained by their publication. It was decided to discontinue publication of further volumes and to concentrate upon maintaining up-to-date information regarding the old and the new registrants on a card index system in the National Register Office of the Council, so that any information desired may be on tap at any moment.

5.9 The system now followed is to maintain for each registrant a card on which are recorded brief particulars about the registrant, extracted from the completed form received from him. The particulars included are : name, present and permanent address, age, qualification, experience, employment particulars and salary. The date of revision of the card is also indicated. Revision forms are sent periodically to old registrants whose cooperation is sought in bringing the information on their cards.^{2/}

6.1 Definitions: Concepts and definitions used in the present study are given below :

Scientist : A 'scientist was defined as a person who possesses either -

(a) a Master's Degree in any one of the branches of Science, namely -

1. Mathematics or Statistics
2. Physics
3. Geology
4. Chemistry (in all branches of specialisations except in pharmaceutical chemistry, industrial chemistry and chemical technology).
5. Botany
6. Zoology

or (b) a Bachelor's Degree in pharmaceutical chemistry, industrial chemistry or chemical technology.

Both M.A. and M.Sc. Degrees as well as B.A. (Hons) and B.Sc(Hons) degrees, considered by the awarding Universities as equivalent to their Master's Degrees, are included under the 'Master's level Degree. Three or four years of college education after the Intermediate examination or five or six years after the High School examination is implied in this definition.

^{2/} These details refer to the working of the National Register Office before the recent reorganisation, following a review of its work by the Government in 1957. The coverage of the Register has now been redefined, more comprehensive forms have been introduced to collect information from different categories of personnel and the staff has been suitably strengthened to ensure a fuller and speedier collection of information, its systematic maintenance and periodic analysis.

Bachelor's level degree in pharmaceutical chemistry, and chemical technology are those that are obtained after a minimum of three years study after the Intermediate stage.

6.2 Age group : Throughout this report age is given in five year groups beginning at age 21 and going upto 'over 60'. The ages are as of 1955.

6.3 Employment : A scientist was classified as employed, unemployed, or retired on the basis of the information given by him to the National Register at the time of initial registration or the latest renewal of his registration.

6.4 Sector of employment : The sectors of employment of scientists were grouped as follows:-

- a. educational institutions
- b. government departments
- c. industries
- d. laboratories, government
- e. laboratories, private

Educational institutions include schools in addition to colleges and universities. Government departments may be Central, State or local. From the government departments are excluded such departments or sections whose work is that of pure teaching; those are classed under educational institutions. Manufacturing and extractive industries as well as business and trading establishments both in the public and the private sectors are included under 'industry'. Transport undertakings, not already covered under government departments, are also included in this category. All National Laboratories (under the Council of the Scientific and Industrial Research), such Laboratories as those of the Department of Atomic Energy and other departmental laboratories such as, for instance, the Naval Research Laboratory of the Ministry of Defence at Cochin are grouped under government laboratories. All other laboratories are private.

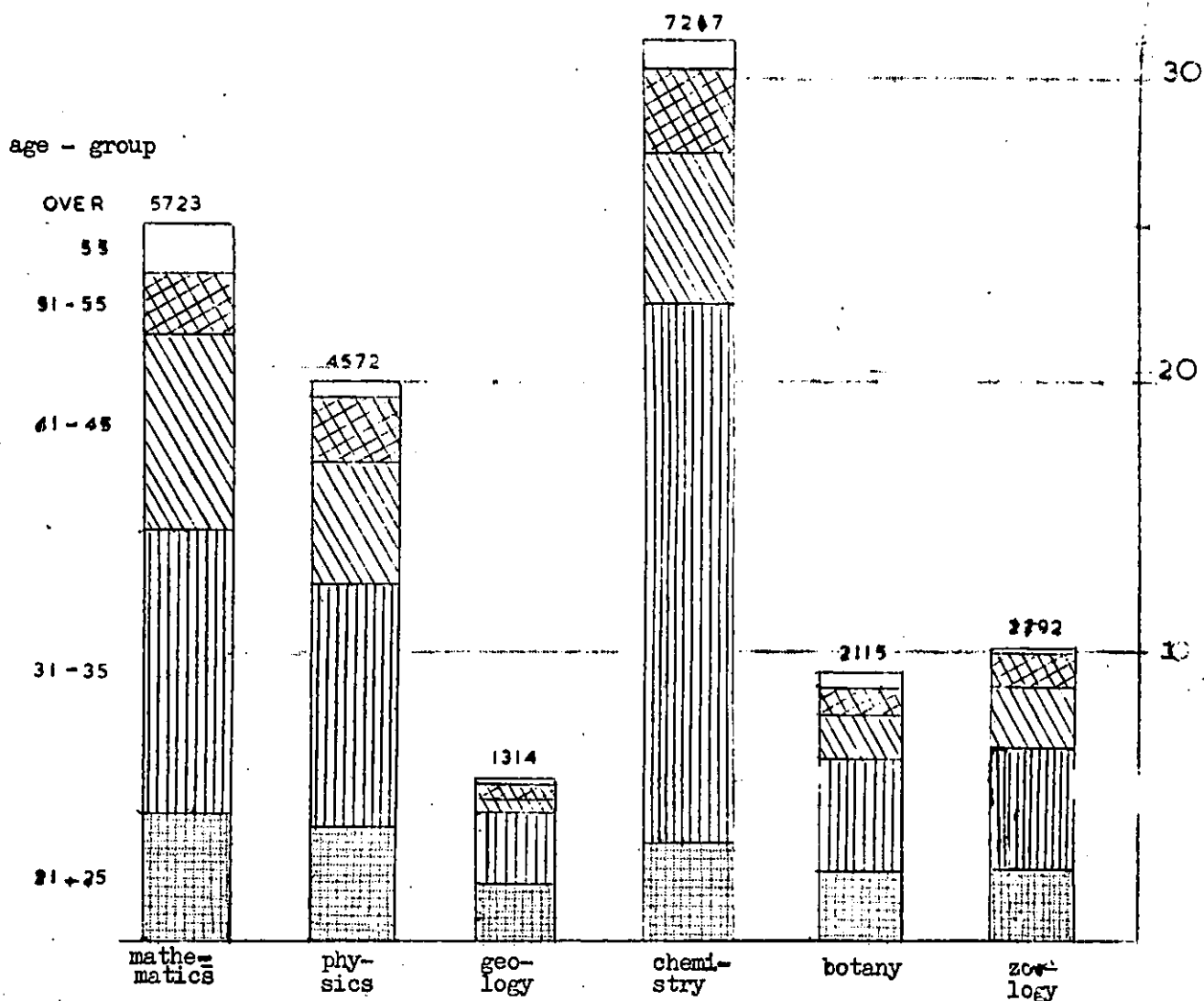
6.5 Functions performed : The functions performed by the scientists were grouped under the following heads:-

- a. teaching
- b. research
- c. technical
- d. administrative

6.6 Salary of scientists - Salary as used in this report is the basic salary (exclusive of all allowances) per month. This was the form in which information was available in the National Register records.

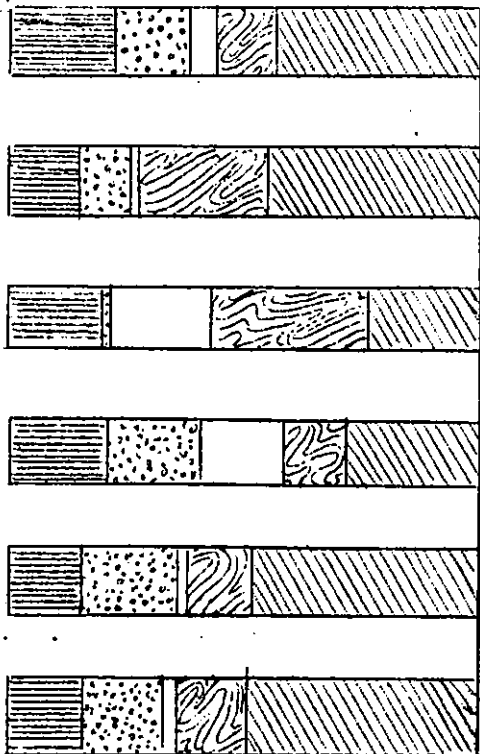
ESTIMATED NUMBER OF SCIENTISTS

percent



EMPLOYMENT SECTOR

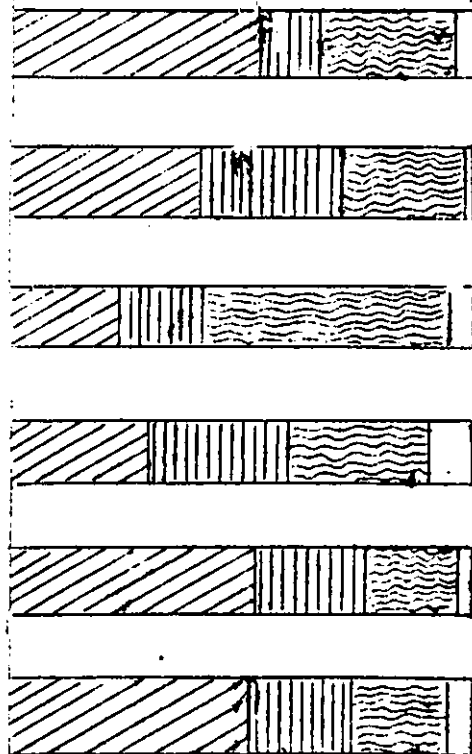
100 90 80 70 60 50 40 30 20 10 %



unempl. & ret. indus. laborator.
 & ret. -try govt. depts.
 educational institutions

FUNCTIONS PERFORMED

10 20 30 40 50 60 70 80 90 100 %



teaching research technical admn.

Reference : Table 5 and 7 of the report.

CHAPTER THREE

Estimate of the number of Scientists in India, 1955

7.1 Pattern of outturn: Data on the number of scientists, as defined earlier, turned out by the universities in India since 1910 were collected from the annual reports and calendars of these universities. In a few cases, when a relevant publication of a university was not available or when the appropriate publication did not contain information in keeping with the rest of the data, gaps had to be filled by estimation. The estimates were made for each university individually by appropriate interpolation using all the information for the preceding and later years which was available for that university. Prior to 1947 there were two universities in the area now comprising Pakistan. Of these the Punjab University has a substitute in India with headquarters at Chandigarh. The other, Dacca University, has no substitute. Data on outturn were collected for the Punjab University upto 1947 as for the other universities; after 1947 the data for Punjab University relates to the substitute one established in India. Data for Dacca University could not be collected, and the figures to that extent are slight underestimates.

7.2 The data so collected on the outturn of scientists is presented in five year groups, by subjects, in Table T.1.

Table T.1: Number of Scientists turned out by Indian Universities 1910-1955

sl. no.	year	number of degrees awarded in								
		all subjects		chemistry						
		num-ber	per-cont	mathe-matics	phy-sics	goo-logy	mas-ter	technology graduate	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	1910-1955	28947	100.0	7533	5897	1552	6460	2209	2197	2799
2	1910-1914	385	1.3	133	89	26	97	-	21	19
3	1915-1919	832	2.9	391	220	25	112	-	48	36
4	1920-1924	917	3.2	269	181	30	328	-	60	49
5	1925-1929	1923	6.6	516	399	47	449	-	245	267
6	1930-1934	2784	9.6	840	630	179	541	12	280	302
7	1935-1939	2938	10.2	819	647	183	637	102	264	286
8	1940-1944	3378	11.7	882	730	200	791	189	282	304
9	1945-1947	2511	8.7	613	462	153	640	270	175	198
10	1948-1949	1864	6.4	461	338	141	519	159	119	127
11	1950-1954	8756	30.2	1976	1668	413	1791	1175	781	952
12	1955	2659	9.2	633	533	155	555	302	222	259

7.3 Nearly 29,000 degrees at the Master's level were awarded in science during the 46 years from 1910 to 1955. Of these only about 4 percent were awarded during the ten years before 1920, about 10 percent between 1920 and 1929, and 20 percent between 1930 and 1939. While in the eight years before Independence (between 1940 to 1947) nearly twenty percent of all degrees were awarded, in the eight years since then, that is between 1948 to 1955, more than forty five percent were accounted for.

7.4 Columns 2 and 3 of the following table shows the mean annual outturn for each of the four and a half decades from 1910.

Table T.2: Growth of outturn of scientists, 1910-1955

sl. no.	decades	mean annual outturn (number)	mean annual outturn in the decade with that of the preceding decade as 100
(0)	(1)	(2)	(3)
1	1910-1955	629	-
2	1910-1919	122	-
3	1920-1929	284	233
4	1930-1939	572	201
5	1940-1949	775	135
6	1950-1954	1751	226
7	1955	2659	-

7.5 The annual outturn of scientists in 1955 was three and half times larger than the average 10 years earlier and about 22 times the annual average of the decade 1910-1919. The average annual outturn of each decade has generally tended to be a little more than double of that of the preceding decade but for one exception, namely, the decade of 1940-49 which was dominated by the War.

8.1 In order to bring out the relative weightage of the subjects, percentage distribution among subjects of scientists turned out in each of the preceding decades is shown in table:T.3.

Table T.3: Percentage distribution of Scientists turned out in each decade from 1910-1955 by subjects.

sl. no.	decade	percentage of degrees awarded in						
		all sub-jects	matho-matics and sta-tistics	phy-sics	geo-logy	chemistry and chemi-cal techno-logy	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	1910-1955	100	26.0	20.4	5.4	29.9	8.6	9.7
2	1910-1919	100	43.0	35.4	4.2	17.2	5.7	4.5
3	1920-1929	100	27.7	20.4	2.7	27.4	10.7	11.1
4	1930-1939	100	29.0	22.3	6.3	22.6	9.5	10.3
5	1940-1949	100	25.3	19.7	6.4	33.1	7.4	8.1
6	1950-1954	100	22.8	19.0	4.7	33.9	8.9	10.9
7	1955	100	23.9	20.0	5.8	32.2	8.4	9.7

8.2 The relative proportion of different subjects, taking into account the total outturn during the whole period 1910-1955, is seen to correspond very closely with the pattern of distribution for 1955. Barring the first decade, this relative proportion among the various subjects shows a more or less stable pattern in each decade, with mathematics accounting for a quarter of the total outturn, physicists, a fifth, chemists and chemical technologists a third, botanists and zoologists less than a tenth each and geologists half as much.

9.1 Age at passing : The National Register records for each individual the year of birth and the year of passing the relevant degree examination. Using these two sets of data, Table T.4 has been worked out to show the age distribution of scientists at the time of passing the relevant examination.

Table T.4: Age distribution of scientists at the time of passing the qualifying examination

sl. no.	age at passing	percentage passing in						
		all sub-jects and sta-tistics	mathe-matics	phy-sics	geo-logy	chemis-try	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	all ages	100	100	100	100	100	100	100
2	below 21	6.9	10.1	5.5	7.2	6.1	5.6	7.0
3	21	14.8	14.4	13.8	19.0	18.3	11.6	11.4
4	22	23.5	25.8	27.7	22.9	29.4	18.5	16.8
5	23	20.0	19.0	19.8	19.6	20.6	23.1	18.1
6	24	12.9	11.2	13.0	11.9	13.3	14.4	13.6
7	25	7.7	8.0	8.3	7.6	4.5	8.1	9.8
8	26	5.3	2.9	4.5	5.2	3.8	7.2	7.6
9	27	3.4	3.4	3.1	3.1	2.7	3.9	4.3
10	over 27	5.5	5.2	4.3	3.4	5.3	7.6	11.4
11	mean ages	23.1	23.0	22.9	22.7	22.7	23.5	23.3
12	no. of obser-vations	(2983)	(434)	(516)	(218)	(786)	(497)	(532)

Source: National Register, CSIR

Note : Row 12 gives the number of observations in the samples; on which the age distribution has been based.

9.2 It was assumed that the average distribution shown in Table T.4 above is applicable to the outturn of all years. It is quite possible that a detailed study might have revealed some variations in this age distribution through the years, but the information available in the National Register was not adequate for such a detailed examination. Moreover, whatever fragmentary data of this kind was available did not show any marked deviation from the pattern shown in this table. For the purpose of the present study, further refinement on this point seemed to be unnecessary.

10.1 Scientists surviving in 1955 : An estimate of the number of scientists living in India towards the end of 1955 was worked out from the data presented in Tables T.1 and T.4 by the application of appropriate Life Tables.

10.2 In order to obtain the number of scientists surviving in India towards the end of 1955, the figures of gross outturn have to be adjusted to take account of losses due to:-

- a. normal mortality; and
- b. migration to Pakistan in consequence of Partition of the sub-continent in 1947.

Mortality was calculated on the basis of all-India Census Life Tables for Males using different tables for different decades. For the decades 1921-30 and 1941-50 official tables were available and were used. For the decades 1911-20 and 1931-40 in the absence of official tables, those given by Kingsley Davis in his book "Population of India and Pakistan" were used. Adjustments on account of losses due to partition were made by a flat reduction of five percent from the estimated number surviving in 1947. A reduction of this order was considered justified on the ground that roughly 5 percent of the scientists turned out during 1910-1947 were Muslims.^{3/}

10.3 After the necessary adjustments, the number of scientists estimated to have been surviving in India towards the end of 1955 was estimated as 23283. The distribution of this number by age group and subject is presented in Table T.5 below:

Table T.5: Estimated number of scientists in India, 1955 by age group and subject

sl. no.	age group	estimated number surviving in 1955						
		all sub-jects	mathe-matics and sta-tistics	phy-sics	geo-logy	chemis-try	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	all ages	23283	5723	4572	1314	7267	2115	2292
2	21-25	4438	1097	869	497	857	565	553
3	26-30	6902	1373	1082	392	2771	612	672
4	31-35	4336	1080	859	190	1488	316	403
5	36-40	2538	687	568	86	787	194	216
6	41-45	1926	572	453	54	544	139	164
7	46-50	1405	388	380	42	365	109	121
8	51-55	919	252	201	27	258	85	96
9	56-60	519	176	74	15	157	58	39
10	over 60	300	98	86	11	40	37	28

10.4 About eighty percent of the total outturn of 28,947 scientists between 1910 and 1955 were estimated to be surviving in 1955. Half of them were between 21-30 years and more than three-fourths below 40 years in age. The number of scientists in the age group 21-25 was nearly 50 times

^{3/} This ratio of 5 percent was arrived at on the basis of whatever information regarding religious distribution of persons passing examinations was available in the calendars and annual reports of Indian Universities, as well as some scattered information on the topic available in the relevant publications of the Central Ministry of Education.

greater than their number in the age group 51-55. Table T.6 presents the cumulated percentage distribution of scientists by age and subject.

Table T.6: Cumulative percentage distribution by age of estimated surviving scientists in India, 1955

sl. no.	age upto	cumulated percentage						
		all sub-jects	mathe-matics and sta-tistics	phy-sics	geo-logy	chemis-try	botany	zoology
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	25	19	19	19	38	12	27	24
2	30	49	43	43	68	50	56	53
3	35	67	62	61	82	70	71	71
4	40	78	74	74	89	81	80	80
5	45	86	84	84	93	89	86	88
6	50	93	91	92	96	94	91	93
7	55	96	95	96	98	97	96	97
8	60	99	98	98	99	99	98	99
9	all	100	100	100	100	100	100	100

10.5 While a little less than a fifth of all scientists were of age 25 years or less in 1955, the proportion was double as much in the case of geologists and about one and a half times for botanists and zoologists. In contrast the proportion of chemists below 26 years in age was only two-thirds of that obtaining for all scientists.

11. Twenty-five out of one hundred scientists living in India in 1955 were mathematicians, twenty were physicists, six were geologists, thirtyone were chemists and nine and ten respectively were botanists and zoologists. The percentage distribution among the subjects is shown in Table T.7:

Table T.7: Percentage distribution of scientists by subjects

sl. no.	subject	percent
1	all subjects	100
2	mathematics & statistics	24.6
3	physics	19.6
4	geology	5.6
5	chemistry	31.2
6	botany	9.2
7	zoology	9.8

CHAPTER FOUR

Coverage of the National Register, 1955

12.1 Registered scientists: All persons enrolled in the National Register were not included in this study. Only those who came under the definition of scientists given earlier and who had furnished information about themselves as of 1955 were considered. About three to five percent of the total enrolled scientists, who did not conform to the criteria for inclusion in the study, had to be left out. They were not regarded as registered scientists for the purposes of this study.

12.2 A little over 12,300 scientists were 'registered' by the end of 1955. This was 53 percent of the total of 23,400 scientists estimated living at that time. Table T.8 below distributes these scientists by age and subject.

Table T.8: Scientists enrolled in the National Register, 1955

sl. no.	age group	number of scientists registered in						
		all sub-jects	mathe-matics and sta-tistics	phy-sics	geo-logy	chemis-try	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	all ages	12351	2069	2182	854	4516	1346	1384
2	21-25	2528	480	513	324	554	338	319
3	26-30	3331	436	532	254	1275	393	441
4	31-35	2275	362	392	123	978	188	232
5	36-40	1342	241	245	56	556	117	127
6	41-45	1067	179	177	34	486	95	96
7	46-50	768	130	139	27	318	82	72
8	51-55	563	105	114	18	204	64	58
9	56-60	319	84	45	10	114	45	21
10	over 60	158	52	25	8	31	24	18

12.3 17 percent of the registered scientists were in the field of mathematics and statistics, 18 percent in physics, 7 percent in geology, 37 percent in chemistry, and 11 percent each in botany and zoology.

12.4 Table T.9 below shows the percentage distribution of the registered scientists by age.

Table T.9: Percentage distribution of registered scientists by age

sl. no.	age group	subjects						
		all sub-jects	mathe-matics and sta-tistics	phy-sics	geo-logy	chemis-try	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	all ages	100	100	100	100	100	100	100
2	21-25	20	24	25	38	12	25	23
3	26-30	27	21	24	30	28	29	32
4	31-35	18	17	18	14	22	14	17
5	36-40	11	12	11	7	12	9	9
6	41-45	9	8	8	4	11	7	7
7	46-50	6	6	6	3	7	6	5
8	51-55	5	5	5	2	5	5	4
9	56-60	3	4	2	1	2	3	2
10	over 60	1	3	1	1	1	2	1

13.1 Coverage of the Register: All Scientists: 53 percent of the scientists in India at the end of 1955 were enrolled in the National Register. The coverage was low for mathematicians and statisticians (36 percent), about average for physicists (48 percent) but was much higher, (ranging between 60 to 65 percent) for the other scientists. The following table shows the relative coverage of the register by subject.

Table T.10: Coverage of the National Register by subject field

sl. no.	subject	percent of scientists		registered as percent of living
		living	registered	
(0)	(1)	(2)	(3)	(4)
1	all subjects	100	100	53
2	mathematics & statistics	24	17	36
3	physics	20	18	48
4	geology	6	7	65
5	chemistry	31	37	62
6	botany	9	10	64
7	zoology	10	11	60

13.2 As regards the coverage by age, the registered scientists show an age distribution which is closely in step with the expected age distribution of all scientists surviving, as estimated in Chapter Three. The coverage was least (50 percent) for persons in

the age group 26-35, about average for 36-45 and better than average (57-58 percent) for age groups 21-25 on the one hand and 46-55 and over 55 on the other. This is shown in Table T.11.

Table T.11: Coverage of the National Register, by age.

sl. no.	subject	percent of scientists		registered as percent of living
		living	registered	
(0)	(1)	(2)	(3)	(4)
1	all ages	100	100	53
2	21-25	19	20	57
3	26-35	48	45	50
4	36-45	19	20	54
5	46-55	10	11	57
6	over 55	4	4	58

13.3 The coverage of the Register by individual subjects is shown in Table T.12 that follows.

Table T.12: Coverage of the National Register, by age group and subject

sl. no.	age group	percent of scientists			regis-tered			percent of scientists			regis-tered		
		living	regis-tered	as per-cent of living	as per-cent of living	regis-tered	as per-cent of living	as per-cent of living	regis-tered	as per-cent of living	as per-cent of living		
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)			
		1. mathematics			2. physics			3. geology					
1	all ages	100	100	36	100	100	48	100	100	65			
2	21-25	19	23	44	19	24	59	38	38	65			
3	26-35	43	39	33	42	42	48	44	44	65			
4	36-45	22	20	33	23	19	41	11	11	64			
5	46-55	11	11	37	13	12	44	5	5	65			
6	over 55	5	7	50	3	3	44	2	2	69			
		5. chemistry			6. botany			7. geology					
7	all ages	100	100	62	100	100	64	100	100	60			
8	21-25	12	12	65	27	25	60	24	23	58			
9	26-35	59	50	53	44	43	63	47	49	63			
10	36-45	18	23	78	16	16	64	17	16	59			
11	46-55	8	12	84	9	11	75	9	9	60			
12	over 55	3	3	74	4	5	73	3	3	73			

13.4 In respect of mathematics and statistics, the coverage varied from 33 per cent to 50 per cent for different age groups. The register was weighted in favour of the youngest and the oldest age groups. In the case of physics the overall coverage was 48 per cent but the coverage of age group 21-25 was as high as 59 per cent. Age group 26-35 was represented at an average level; the other age groups had almost equal coverage, all being somewhat below average. The coverage in respect of geology was not only the best of all subjects but it was more or less uniform for all age groups. As for chemistry, while the overall coverage was 62 per cent, there was wide disparity in the coverage of different age groups. The age group worst represented was 26-35 with a coverage of only 53 per cent, as compared to the higher age groups wherein coverage ranged from 74 to 84 per cent. The overall coverage was 64 per cent for botanists. It varied between 60 per cent in the age group 21-25 to 75 per cent in the age group 46-55. The age distribution pattern of the registered was closely in step with that of the living. The overall coverage for Zoology was 60 per cent and it was more or less at this level for all age groups except over 55 for which it was 73 per cent. The age distribution of the registered is therefore, naturally very similar to that of 'living'.

14.1 In the absence of fuller data from other independent sources, it is not easy to make a critical appraisal of the coverage of the National Register in regard to other characteristics, such as, for instance, employment sectors or functions. A few comments may, however, be made.

14.2 Firstly, it is seen that out of the 12351 registered scientists 2180 were unemployed. Further 1198 of these were in the age group 21-25 and 744 in the age group 26-30. The National Register has an arrangement with the Employment Exchanges by which particulars of registrants at the Employment Exchanges are forwarded as a matter of routine to the National Register. To the extent one can assume that the Employment Exchanges register practically all the unemployed scientists, the coverage of the National Register in respect of the unemployed scientists would also become fairly full. On the other hand the overall coverage of the National Register is much more deficient, with the result that the unemployed would appear to constitute a much larger proportion of the total number

if data of the National Register were to be taken at their face value.

14.3 Secondly, 4,746 out of 10,070 employed scientists were teachers, all of whom were teaching in universities and colleges but none in schools. This suggests that while the coverage was likely to be fairly satisfactory in respect of scientists teaching in universities and colleges, conceivably a good number of teachers in high schools, having a master's degree in science would seem not to have found a place in the Register.

14.4 Thirdly, it is known that a fair proportion of scientists work in fields other than their specialised subjects, as for instance, in the administrative services. Few of this category have been included in the Register and for good reasons. The Register is not concerned with collecting particulars of persons who no longer function in the field of science, even though they might have initially taken a master's degree in a science subject. The Register has, in fact, less than one per cent of the total number of registered 'scientists' who are not working in the field of science. As the actual percentage of this category is likely to be very much more than the one per cent shown by the Register, it is reasonable to infer that the Register has a relatively much higher proportion of 'active' scientists than a superficial comparison with the number of surviving scientists would indicate.

15. The general conclusion may be drawn that the National Register in respect of scientists was fairly fully representative of university and college teachers and the unemployed on the one hand and on the other it completely excluded school teachers and personnel working in fields other than that of science. Nothing definite could be stated about the extent of coverage of research personnel and those working in industries in scientific occupations.

CHAPTER FIVE

Age, Education and Employment

16. Educational level and age : The distribution of scientists enrolled in the National Register by age and level of education is given in Table T.13 below:

Table T.13 : Distribution of all living and those registered in the National Register by age group and level of education.

Sl. no.	age-group	all living	all registered			doctors as percent. of	
			both levels	master	doctors	all registered	all living
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	all ages	23293	12351	10753	1608	13.0	6.9
2	21 - 25	4458	2523	2503	25	1.0	0.6
3	26 - 30	6902	3331	3194	137	4.1	2.0
4	31 - 35	4336	2275	1927	348	15.2	8.0
5	36 - 40	2538	1345	1101	251	18.7	19.9
6	41 - 45	1926	1067	800	267	25.0	13.9
7	46 - 50	1405	768	554	214	27.9	15.2
8	51 - 55	919	563	370	193	34.3	21.0
9	56 - 60	519	319	211	108	33.9	20.8
10	over 60	300	152	93	65	41.1	21.7

A comparison of columns 2 and 3 shows the gaps in the coverage of the National Register and indicates that almost half the number have been left out. The coverage varies for masters and doctors. It would appear to be fairly complete in respect of doctor scientists as most of them are engaged in scientific pursuits and likely to be included in the National Register which has been making special efforts to compile information about scientists actively engaged in scientific work. On this assumption, a better estimate of doctors as percentage of all scientists is provided by comparing col. 5 with col. 2 rather than with col. 3 that is, by using col. (7) rather than col. (6). It is seen that doctor scientists constitute less than 2 per cent of scientists in the age group 21-30; they are 8 per cent of the total in the age group 31-35, between 14 to 20 per cent in the ages 36-50 and at a fairly stable level of about 21-22 per cent thereafter.

17. Educational level and subject : The table that follows gives the distribution of the registered scientists by level of education and subject.

Table T.14 : Distribution of registered scientists by subject of specialisation and level of education

sl. no.	subject	all living	registered			doctors as percent of	
			both levels	master	doctor	all registered	all living
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	all subjects	23283	12351	10743	1608	13.0	6.9
2	mathematics	5723	2069	1810	259	12.5	4.5
3	physics	4572	2182	1927	255	11.7	5.5
4	geology	1314	854	798	56	6.6	4.3
5	chemistry	7267	4516	3890	626	13.9	8.6
6	botany	2115	1346	1139	207	15.4	9.8
7	zoology	2292	1384	1179	205	14.8	8.9

The proportion of doctors to all scientists is about 9 to 10 per cent in chemistry, botany and zoology, about 5 to 6 per cent in physics and between 4 to 5 per cent in mathematics and zoology.

18. A further breakdown by age is provided in Table T.15 below :

Table T.15 : Percentage of registered doctor scientists to all registered and all living scientists in percentages to total in each age group.

sl. no.	age-group	all subjects	sub-mathematics	physics	geology	chemistry	zoology	botany any
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
doctor scientists to all registered scientists								
1	all ages	13.0	12.5	11.7	6.6	13.9	15.4	14.8
2	21 - 25	1.0	0.1	1.2	0.6	1.3	0.9	0.9
3	26 - 30	4.1	3.2	4.8	3.2	4.6	3.8	3.6
4	31 - 35	15.3	9.9	13.8	9.8	15.8	23.9	20.1
5	36 - 40	18.7	14.1	15.1	16.1	17.3	31.6	29.9
6	41 - 45	25.0	22.9	26.6	20.6	21.8	36.8	32.2
7	46 - 50	27.9	29.2	23.0	25.9	25.2	39.0	34.7
8	51 - 55	34.3	33.3	21.1	22.2	36.8	40.6	50.0
9	56 - 60	33.9	39.3	35.6	40.0	32.5	22.2	38.1
10	over 60	41.1	46.2	52.0	37.5	41.9	16.7	44.4
doctor scientists to all living scientists								
11	all ages	6.9	4.5	5.6	4.3	8.6	9.8	8.9
12	21 - 25	0.6	0.4	0.7	0.4	0.8	0.5	0.5
13	26 - 30	2.0	1.0	2.4	2.0	2.1	2.5	2.4
14	31 - 35	8.0	3.3	6.3	6.3	10.4	14.2	11.7
15	36 - 40	9.9	4.9	6.5	10.5	12.2	19.1	17.6
16	41 - 45	13.9	7.2	10.4	13.0	19.5	25.2	18.9
17	46 - 50	15.2	9.8	8.4	15.7	21.9	29.4	20.1
18	51 - 55	21.0	13.9	11.9	14.8	29.1	30.6	30.2
19	56 - 60	20.8	18.4	21.6	26.7	23.6	17.2	20.5
20	over 60	21.7	24.4	15.1	27.3	32.5	10.8	28.6

19.1 Employment : Table T.16 gives the distribution of all registered scientists, classified by subject fields, under three main categories - employed, unemployed and retired. The employed are further distributed by five sectors of employment, namely educational institutions, government department, industry, government laboratories and private laboratories. For convenience of reference, percentage figures with all registered in each subject field as 100 have also been presented.

Table T.16 : Distribution of all registered scientists, by subject field and sector of employment.

sl. no.	subject	all registered	all employed	educational institutions	government department	industry	govt lab.	pvt. lab.	unemployed	retd.
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
number										
1	all subjects	12351	10070	4746	2114	981	1700	529	2180	101
2	mathematics	2069	1619	887	296	72	229	135	409	41
3	physics	2182	1872	1001	581	39	130	121	302	8
4	geology	854	686	211	277	101	89	8	159	9
5	chemistry	4516	3597	1348	534	744	835	136	917	2
6	botany	1346	1131	638	194	12	204	83	197	18
7	zoology	1384	1165	661	232	13	213	46	196	23
percentage										
8	all subjects	100	81.5	38.4	17.1	7.9	13.8	4.3	17.7	0.8
9	mathematics	100	78.3	42.9	14.3	3.5	11.1	6.5	19.8	2.0
10	physics	100	85.8	45.9	26.6	1.8	6.0	5.5	13.8	0.4
11	geology	100	80.3	24.7	32.4	11.8	10.4	0.9	18.6	1.1
12	chemistry	100	79.6	29.8	11.8	16.5	18.5	3.1	20.3	0.1
13	botany	100	84.0	47.4	14.4	0.9	15.2	6.2	14.6	1.4
14	zoology	100	84.2	47.8	16.8	0.9	15.4	3.3	14.2	1.6

19.2 Nearly 81 per cent of the registered scientists are employed and about 19 per cent are unemployed or retired. The major sector of employment is educational institutions which accounts for nearly 47 per cent of the employed scientists, followed by government department (21 per cent), government laboratories (17 per cent) industry (10 per cent) and private laboratories (5 per cent). Outside of educational institutions, 70 per cent

of scientists are thus employed in government department or laboratories. Physicists, botanists and geologists have a higher than average representation in educational institutions; geologists and physicists in government departments, chemists and geologists in industry, chemists in government laboratories and mathematicians, physicists and botanists in private laboratories.

Table T. 17 : Distribution of registered scientists by age group and sector of employment.

sl. no.	age group	all registered	sectors of employment						unemp-loyed	reti-red
			all emp.	educ. inst.	govt. dept.	indus-try	labs. govt.	labs. priv.		
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
number										
1	all ages	12351	10070	4746	2114	981	1700	529	2180	101
2	21 - 25	2528	1330	673	263	48	244	102	1198	-
3	26 - 30	3331	2587	1290	543	150	459	145	744	-
4	31 - 35	2275	2111	932	450	230	391	108	164	-
5	36 - 40	1342	1301	535	325	155	225	61	41	-
6	41 - 45	1067	1047	401	255	188	165	38	20	-
7	46 - 50	768	755	372	142	106	106	29	13	-
8	51 - 55	563	558	298	108	60	72	20	-	5
9	56 - 60	319	276	177	21	36	28	14	-	43
10	over 60	158	105	68	7	8	10	12	-	53
percent										
11	all ages	100	81.5	38.4	17.1	7.9	13.8	4.3	17.7	0.8
12	21 - 25	100	52.6	26.6	10.4	1.9	9.7	4.0	47.4	-
13	26 - 30	100	77.7	38.7	16.3	4.5	13.8	4.4	22.3	-
14	31 - 35	100	92.8	41.0	19.8	10.1	17.2	4.7	7.2	-
15	36 - 40	100	96.9	39.9	24.2	11.5	16.8	4.5	3.1	-
16	41 - 45	100	98.1	37.6	23.9	17.6	15.5	3.5	1.9	-
17	46 - 50	100	98.3	48.4	18.5	13.8	13.8	3.8	1.7	-
18	51 - 55	100	99.1	52.9	19.2	10.7	12.8	3.5	-	0.9
19	56 - 60	100	86.5	55.5	6.6	11.3	8.7	4.4	-	13.5
20	over 60	100	66.5	43.0	4.4	5.1	6.4	7.6	-	33.5

19.3 Table T.17 shows the relationship between age and sector of employment, without regard to subject fields. Nearly 90 per cent of the unemployed belong to the age 21-30; the unemployed comprise more than 47 per cent of scientists in the age group 21-25, 22 per cent in 26-30 and 7 per cent in 31-35. Thereafter till the age of 50 the percentage ranges from 3 to 2. In the age groups above 50, there is no unemployment. Retirement becomes important on reaching the age group 56-60, accounting for nearly 14 per cent of the number in the group; it rises to nearly 34 per cent for age over 60.

20.1 The unemployed : The percentage of unemployed among the registered scientists is seen to be nearly 18, the percentage being as low as 14 for the subjects physics, botany and zoology and nearly 20 per cent for chemistry, mathematics and geology. But these figures would appear to be over-estimates as it is known that the coverage of the unemployed scientists is very much better than that of the others. A lower limit can be arrived at by assuming that all the unemployed have been registered. Using the figures of all living scientists by subjects of specialisation from an earlier table, the following results may be put down :

Table T.18 : Estimated levels of unemployment maximum and minimum, by subjects of specialisation

sl. no.	subject of specialisation	per cent unemployed	
		minimum	maximum
(0)	(1)	(2)	(3)
1	all subjects	9.4	17.7
2	mathematics	7.1	19.7
3	physics	6.5	13.8
4	geology	12.1	18.6
5	chemistry	12.6	20.3
6	botany	9.3	14.6
7	zoology	8.5	14.2

20.2 In the same manner, two figures of percentages of unemployed scientists in each age group can be worked out, one comparing the registered unemployed to the total numbers of scientists registered and the other to the estimated number of living scientists. This calculation is shown in the table that follows:

Table T.19 : Percentage of unemployed scientists to total (a) living and (b) registered, in each age group for each subject

sl. no.	all ages	all subjects		maths.		physics		geology		chemistry		botany		zoology	
		(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1	all ages	9.4	17.7	7.1	19.7	6.6	13.8	12.1	18.6	12.6	20.3	9.3	14.6	8.5	14.2
2	21 - 25	27.0	47.4	22.2	50.8	28.3	48.0	22.7	34.9	39.2	60.1	21.8	36.4	24.6	42.6
3	26 - 30	10.8	22.3	8.7	27.3	4.5	9.2	11.0	16.9	15.7	34.1	8.5	13.2	6.8	10.4
4	31 - 35	3.7	7.2	3.1	9.4	0.1	0.5	0.5	0.8	6.5	6.9	5.7	9.6	3.0	5.2
5	36 - 40	1.6	3.0	0.9	2.3	0.2	0.4	1.2	1.8	3.4	4.9	2.2	3.4	0.9	1.6
6	41 - 45	1.0	1.9	0.7	2.2	0.4	0.6	1.8	2.9	2.4	2.7	-	-	-	-
7	46 - 50	0.9	1.7	0.5	1.5	0.5	0.7	-	2.5	2.5	2.8	-	-	-	-

21. Subject field, age group and sector of employment : Table T.20

shows how the employment of scientists differs from one subject field to another. For each subject, the total for each age group has been taken as 100. For example, the figure 15 at the intersection of column 5 and row 6 means that 15 per cent of geologists of age 41-45 are employed in educational institution. This may be compared with the figure 67 in the same row to give the result that compared to their respective number in the age group 41-45, nearly four times as many mathematicians work in educational institution as geologists of the same age group. Similarly a reference to row 17, columns 5 and 6 indicate that proportionately three times as many geologists of the age group 46-50 work in government departments as the chemists of the same age. Again keeping the column unchanged (say column 5) one may move from one row (row 5) to another (row 9). The interpretation in this case would be that among geologists, while only 29 per cent of the total in the age group of 36-40 are employed in educational institution, this sector accounts for the employment of 60 per cent of these in the age group 56-60.

Table T.20 : Percentage distribution of employed scientists in each age-group, by subject field and by sector of employment.

[For each subject field, total in each age-group = 100]

sl. no.	age group	all subjects	mathematics	physics	geology	chemistry	botany	zoology
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
educational institutions								
1.	all ages	47	55	53	31	37	56	57
2.	21 - 25	50	48	57	36	45	64	54
3.	26 - 30	50	53	55	27	43	52	67
4.	31 - 35	44	56	51	29	37	49	46
5.	36 - 40	41	48	41	29	35	52	49
6.	41 - 45	38	57	46	15	24	59	51
7.	46 - 50	49	61	64	33	36	59	53
8.	51 - 55	53	59	63	50	41	63	58
9.	56 - 60	64	79	76	60	49	68	75
10.	over 60	65	68	76	25	52	77	100
government departments								
11.	all ages	21	18	31	40	15	17	20
12.	21 - 25	20	18	20	30	9	14	23
13.	26 - 30	21	19	29	48	14	19	16
14.	31 - 35	21	18	33	40	14	21	25
15.	36 - 40	25	22	49	27	17	20	22
16.	41 - 45	24	23	42	52	19	17	19
17.	46 - 50	19	19	23	45	15	16	21
18.	51 - 55	19	14	30	28	15	20	21
19.	56 - 60	8	5	10	20	11	3	-
20.	over 60	7	6	5	25	10	-	-
industry								
21.	all ages	10	4	2	15	21	1	1
22.	21 - 25	4	3	1	9	8	1	-
23.	26 - 30	6	4	1	13	12	1	1
24.	31 - 35	11	5	2	19	20	1	2
25.	36 - 40	12	4	2	31	23	3	1
26.	41 - 45	18	5	5	24	34	1	3
27.	46 - 50	14	6	7	15	28	-	-
28.	51 - 55	11	5	3	11	24	2	2
29.	56 - 60	13	3	2	-	27	3	8
30.	over 60	8	6	-	50	13	-	-
laboratories : government								
31.	all ages	17	14	7	13	23	18	18
32.	21 - 25	18	21	9	18	34	13	18
33.	26 - 30	18	16	7	10	28	20	13
34.	31 - 35	19	13	9	12	24	22	21
35.	36 - 40	17	16	6	13	22	19	26
36.	41 - 45	16	10	5	9	20	16	26
37.	46 - 50	14	9	3	7	18	20	24
38.	51 - 55	13	13	4	11	16	14	18
39.	56 - 60	10	6	7	20	11	16	8
40.	over 60	9	10	5	-	10	23	-

(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
laboratories : private								
41.	all ages	5	8	7	1	4	7	4
42.	21 - 25	8	10	14	2	3	10	6
43.	26 - 30	5	8	9	1	4	8	4
44.	31 - 35	5	8	5	1	4	6	5
45.	36 - 40	5	10	3	-	4	6	3
46.	41 - 45	4	6	2	-	4	7	1
47.	46 - 50	4	6	4	-	3	6	3
48.	51 - 55	4	10	-	-	4	2	2
49.	56 - 60	5	8	5	-	2	11	8
50.	over 60	11	13	14	-	16	-	-

Note: Totals do not always add up exactly to 100 because of rounding.

CHAPTER SIX

Functions performed and basic salary

22.1 Functions performed: The functions performed by scientists were grouped into four classes: teaching, research, technical, and administrative. The distribution of the 10,070 employed scientists on the rolls of the National Register, by age group and function performed, is presented in the following table:

Table T.21: Distribution of employed scientists on the rolls of the National Register, by age group and function performed

sl. no.	age group	function performed				
		all func-tions	teaching	research	technical	admini-strative
(0)	(1)	(2)	(3)	(4)	(5)	(6)
number						
1	all ages	10070	4354	2362	2898	456
2	21-25	1330	480	499	347	4
3	26-30	2587	1104	747	698	38
4	31-35	2111	905	481	654	71
5	36-40	1301	539	246	457	59
6	41-45	1047	409	172	360	106
7	46-50	755	374	114	204	63
8	51-55	558	311	63	119	65
9	56-60	276	163	30	48	35
10	over 60	105	69	10	11	15
percentage						
11	all ages	100	43.2	23.5	28.8	4.5
12	21-25	100	36.2	37.5	26.1	0.3
13	26-30	100	42.7	28.9	27.0	1.4
14	31-35	100	42.9	22.8	31.0	3.3
15	36-40	100	41.5	18.9	35.1	4.5
16	41-45	100	39.1	16.4	34.4	10.1
17	46-50	100	49.5	15.1	27.0	8.4
18	51-55	100	55.8	11.3	21.3	11.6
19	56-60	100	59.1	10.9	17.4	12.6
20	over 60	100	65.7	9.5	10.5	14.3

22.2 Teaching was the function of the largest proportion of the employed scientists; about 43 percent of all the employed scientists were engaged in it. About 29 percent were performing technical functions, 23 percent were engaged in research and less than 5 percent were occupied with administrative functions. These overall proportions do not hold for the individual age groups. There is marked shift in the relative importance of these functions from the lower age groups to the higher age groups. For example, research and technical functions, among themselves account for 64 percent of the scientists in the age groups 21-25; in the age group 56-60 the corresponding percentage is only 28. Teaching claims about 36 percent of the scientists in the former age group, but as much as 59 percent in the latter. Similarly administrative functions, which account for only 0.3 percent in the lower age group claim more than 14 percent of the total in the higher age group. The intermediate age groups seem to support this trend.

22.3 The subject field of the scientist plays a significant role in determining the relative importance of different functions to be performed. For example, proportionately a much larger number among geologists would be required to be engaged in technical functions than, say, the botanist. In the following table the distribution of scientists belonging to various subject groups has been shown by the function performed.

Table T.22: Distribution of employed scientists by subjects and function performed.

sl. no.	subject	all functions	teaching	research	technical	administrative
(0)	(1)	(2)	(3)	(4)	(5)	(6)
number						
1	all subjects	10070	4354	2362	2898	456
2	mathematics	1619	857	199	516	47
3	physics	1872	963	392	478	39
4	geology	686	163	120	376	27
5	chemistry	3597	1147	1067	1097	286
6	botany	1131	600	300	196	27
7	zoology	1165	616	284	235	30
percentage						
8	all subjects	100	43.2	23.5	28.8	4.5
9	mathematics	100	53.0	12.3	31.9	2.8
10	physics	100	51.4	20.9	25.5	2.2
11	geology	100	23.8	17.5	54.8	3.9
12	chemistry	100	31.9	29.7	30.5	7.9
13	botany	100	53.8	26.5	17.3	2.4
14	zoology	100	52.9	24.4	20.2	2.5

22.4 A little over half (51-54 percent) of the employed scientists in each of the subject group, mathematics, physics, botany and zoology are soon to be engaged in teaching. The percentage is less than 32 for chemists and chemical technologists and still smaller, less than 24, for geologists. Similarly, research and technical functions taken together account for about 45 percent (44-46 percent) of all scientists in each of the four subject groups, mathematics, physics, botany and zoology; this ratio is surprisingly stable, although the emphasis as between research and technical functions is somewhat different in different subject groups. On the other hand, these two functions account for more than 60 percent of the chemists and chemical technologists and 72 percent of the geologists, the relative proportion of research to technical being 1:1 for the former and 1:3 for the latter. Finally, the administrative functions claim nearly 8 percent of chemists and chemical technologists, 4 percent of geologists and only 2 to 3 percent of the scientists belonging to other subject fields.

22.5 Detailed analysis of employed scientists by age group, subject field and function performed is set out in the Table T.23 below which is on the same lines as Table T.20 discussed earlier.

Table T.23: Percentage distribution of employed scientists in each age group and different subject fields by functions performed.

(For each subject, number in age group= 100)

sl. no.	age-group	all subjects	mathe- matics	phy- sics	geo- logy	chemis- try	botany	zoo- logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
teaching								
1	all ages	42	53	51	28	81	54	53
2	21-25	36	41	42	17	23	48	44
3	26-30	43	51	49	24	31	51	56
4	31-35	43	57	53	29	33	53	46
5	36-40	42	47	45	28	34	54	51
6	41-45	39	53	51	15	24	61	55
7	46-50	50	59	66	33	35	59	61
8	51-55	56	64	67	50	41	63	65
9	56-60	59	65	71	60	47	66	75
10	over 60	66	77	81	25	42	69	100
research								
11	all ages	24	12	21	18	30	27	24
12	21-25	38	23	40	37	54	39	32
13	26-30	29	13	27	13	42	28	25
14	31-35	23	9	17	7	31	27	26
15	36-40	19	12	13	2	25	23	23
16	41-45	16	11	12	6	20	18	20
17	46-50	15	9	12	7	18	21	17
18	51-55	11	10	6	6	14	13	14
19	56-60	11	12	15	-	8	16	8
20	over 60	10	6	19	-	7	15	-
technical								
21	all ages	29	32	26	55	31	17	20
22	21-25	26	36	18	46	21	13	24
23	26-30	27	36	23	63	23	21	19
24	31-35	31	33	29	63	30	21	25
25	36-40	35	39	40	56	34	23	23
26	41-45	34	27	34	58	43	10	16
27	46-50	27	27	18	41	37	11	14
28	51-55	21	21	18	29	27	13	14
29	56-60	17	17	10	-	29	-	-
30	over 60	11	6	-	50	23	-	-
administrative								
31	all ages	5	3	2	4	8	2	3
32	21-25	-	-	-	-	2	-	-
33	26-30	1	1	1	-	4	-	-
34	31-35	3	2	2	2	6	-	2
35	36-40	4	3	2	13	7	-	2
36	41-45	10	8	3	21	14	2	9
37	46-50	8	5	4	19	10	10	8
38	51-55	12	5	9	17	17	13	7
39	56-60	13	6	5	40	16	18	17
40	over 60	14	10	-	25	29	15	-

23.1 The next Table T.24 shows the functions performed by scientists in each of the five main sectors of their employment.

Table T.24: Distribution of employed scientists by sector of employment and function performed.

sl. no.	sector of employment	function performed				
		all func-tions	teaching	research	technical	adminis-trative
(0)	(1)	(2)	(3)	(4)	(5)	(6)
number						
1	all sectors	10070	4354	2362	2898	456
2	educ. insts.	4746	4251	465	8	22
3	govt. depts.	2114	50	313	1549	202
4	industry	981	-	65	802	114
5	labs. govt.	1700	36	1214	366	84
6	labs. prvt.	529	17	305	173	34
percentage						
7	all sectors	100	43.2	23.5	28.8	4.5
8	educ. inst.	100	89.5	9.8	0.2	0.5
9	govt. dept.	100	2.4	14.8	73.3	9.5
10	industry	100	-	6.6	81.8	11.6
11	labs. govt.	100	2.1	71.5	21.5	4.9
12	labs. prvt.	100	3.2	57.7	32.7	6.4

23.2 All but 2 or 3 percent of scientists performing teaching functions were employed in educational institutions; the remaining were divided equally between government departments and laboratories. Nearly 51 percent of scientists occupied with research were employed in government laboratories, 13 percent each in private laboratories and government departments and 20 percent in educational institutions. Industry claimed less than 3 percent of them. Government departments were the biggest employers of scientists doing technical functions, claiming 53 percent of their total; industry came next with 28 percent, followed at some interval by government laboratories (13 percent) and private laboratories (6 percent). A similar trend is observable in the case of administrative function, the respective percentages being: government departments 45; industry 25; government and private laboratories 25; and educational institution 5.

23.3 Teaching and research are the two most important functions in educational institutions and account for nearly 99 percent of the total; technical and research functions claim 88 percent of scientists employed in government departments, 93 percent in government laboratories and 90 percent in private laboratories. The two most important functions for the industrial sector are technical and administrative which account for more than 93 percent of scientists employed in that sector. It is noteworthy that while about 10-12 percent of all scientists in government departments and industry were engaged in administrative functions, the corresponding percentage was only half as much for laboratories.

24.1 "Doctor" scientists: Nearly 15 percent of the employed scientists enrolled with the National Register, held a doctorate degree in science. The distribution of scientists by level of education (master degree or doctor degree) and functions performed is set out in the Table T.25 below:

Table T.25: Distribution of employed scientists by level of education and function performed.

sl. no.	function	level of education						doctor as percent of both level
		number			percentage			
		both level	mas-ter	doc-tor	both level	mas-ter	doc-tor	
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	all functions	10070	8529	1541	100	100	100	15.3
2	teaching	4354	3594	760	43.2	42.1	49.3	17.5
3	research	2362	1890	472	23.5	22.2	30.7	20.0
4	technical	2898	2730	168	28.8	32.0	10.9	5.8
5	administrative	456	315	141	4.5	3.7	9.1	30.9

24.2 "Master" scientists, distributed by functions performed showed a significantly different pattern than doctor scientists. Teaching accounted for about 42 percent of masters and 49 percent of doctors; research 22 percent of masters and 31 percent of doctors; technical 32 percent of masters and only 11 percent of doctors; and administration less than 4 percent of masters and 9 percent of doctors. The higher proportion of doctors in other functions was evidently at the expense of a much lower proportion in technical functions. Technical

functions had almost a third of masters and only a little over one-tenth of the doctors. Between one-fifth and one-sixths of scientists engaged in teaching and research and a little less than one-third occupied with administrative function were doctors. Among scientists doing technical functions doctors were less than 6 percent. The following table gives the percentage of doctor scientists to the total scientists engaged in various functions for each subject separately.

Table T.26: Percentage of doctor scientists to total scientists engaged in various functions by subjects.

sl. no.	function	all sub-jects	mathe-matics	phy-sics	geo-logy	chemis-try	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	all functions	15.3	14.3	15.3	7.9	16.9	17.8	16.9
2	teaching	17.5	14.0	17.1	16.6	23.1	17.9	15.9
3	research	20.0	36.7	21.7	5.0	15.1	26.0	29.6
4	technical	5.8	2.7	7.6	4.8	7.6	4.1	4.3
5	administrative	30.9	51.1	11.5	11.1	35.0	18.5	16.7

25.1 Salary of scientists: The salary of scientists discussed in the Report is the basic monthly salary exclusive of all allowances or free quarters etc., during 1955. Of the 10,070 scientists who were reported to be employed, only 7178 had reported their salaries as of 1955. The others had either not supplied the information or the information supplied related to earlier years.

25.2 Scientists were grouped into eight salary classes depending upon the basic salary drawn. The following Table T.27 shows the distribution by age and salary groups of 7178 scientists who had reported their salaries.

Table T.27: Distribution of scientists by age and salary groups

sl. no.	age group	basic salary group								
		all	upto 150	151-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-3000
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
number										
1	all ages	7178	844	2453	2512	786	335	161	63	24
2	21-25	1024	289	555	171	9	-	-	-	-
3	26-30	1916	389	978	511	37	1	-	-	-
4	31-35	1481	110	541	668	123	32	7	-	-
5	36-40	887	40	170	455	163	43	14	2	-
6	41-45	669	8	107	321	155	50	24	4	-
7	46-50	529	7	64	213	118	72	43	12	-
8	51-55	432	-	33	129	123	80	41	23	3
9	56-60	175	-	3	36	48	41	21	14	12
10	over 60	65	1	2	8	10	16	11	8	9
percentage of each age-group										
11	all ages	100	11.8	34.2	35.0	10.9	4.7	2.2	0.9	0.3
12	21-25	100	28.2	54.2	16.7	0.9	-	-	-	-
13	26-30	100	20.3	51.0	26.7	1.9	0.1	-	-	-
14	31-35	100	7.4	36.5	45.1	8.3	2.2	0.5	-	-
15	36-40	100	4.5	19.2	51.3	18.4	4.8	1.6	0.2	-
16	41-45	100	1.2	16.0	48.0	23.1	7.5	3.6	0.6	-
17	46-50	100	1.3	12.1	40.3	22.3	13.6	8.1	2.3	-
18	51-55	100	-	7.6	29.9	28.5	18.5	9.5	5.3	0.7
19	56-60	100	-	1.7	20.6	27.4	23.4	12.0	8.0	6.9
20	over 60	100	1.5	3.1	12.3	15.4	24.6	16.9	12.3	13.9
percent of each salary group										
21	all ages	100	100	100	100	100	100	100	100	100
22	21-25	14.3	34.3	22.6	6.8	1.1	-	-	-	-
23	26-30	26.7	46.2	39.9	20.3	4.7	0.3	-	-	-
24	31-35	20.6	13.0	22.1	26.6	15.6	9.6	4.3	-	-
25	36-40	12.4	4.7	6.9	18.2	20.8	12.8	8.7	3.2	-
26	41-45	9.3	0.9	4.4	12.8	19.8	14.9	14.9	6.3	-
27	46-50	7.4	0.8	2.6	8.5	15.0	21.5	26.8	19.0	-
28	51-55	6.0	-	1.3	5.1	15.6	23.9	25.5	36.6	12.5
29	56-60	2.4	-	0.1	1.4	6.1	12.2	13.0	22.2	50.0
30	over 60	0.9	0.1	0.1	0.3	1.3	4.8	6.8	12.7	37.5

25.3 About 12 percent of the scientists were employed on a salary not exceeding 150 per month. One third of them were of age between 21 and 25, and nearly eighty percent were below 30. Thirty four percent of the scientists were in the salary group of Rs. 151-250 a month, of whom 37 percent were above 30 years. About the same proportion was in the salary group Rs. 250-500 but of them only 7 percent were in the age group 21-25 and 20 percent in 26-30, the remaining 70 percent being all persons above 30 years in age. The salary group 501-1000 claimed less than 15 percent of all scientists. All but 4 percent of them were over 30 years of age, nearly two thirds being older than 40 years and 30 percent above 50 years. Scientists drawing salary exceeding Rs. 1000 per month were only 3.3 percent of their total number, none of them being below 30 years in age, and less than 10 percent below 40 years. One third were in the age group 41-50 and the rest of these higher paid persons were all aged 50 years or more.

25.4 The same table also shows how the proportion of higher paid scientists increases as we move from the lower age group to the higher age group. For example it is seen that not even 2 percent of scientists upto age 30 receive salaries exceeding Rs. 500. This percentage is 11, for the age group 31-35 and rises through each successive age group to 63 percent in the age group 51-55, and to nearly 92 percent in the ages over 55. At the other end of the scale, the percentage of scientists whose salary is below Rs. 500 per month is nearly 75 for those upto 30 years of age. It declines to 44 in age group 31-35, and through successive age group to less than 2 percent in the age group 56-60.

25.5 The following Table T.28 presents detailed breakdown of scientists who had reported salary by subject and salary group.

Table T.28: Distribution of scientists by subjects and salary group

sl. no.	salary group (Rs. per month)	all subjects	mathe- matics	phy- sics	geo- logy	chemi- stry	botany	zoo- logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
number								
1	all groups	7178	1402	1768	612	1137	1081	1098
2	upto 150	844	204	137	74	52	195	182
3	151- 250	2453	418	623	145	293	478	496
4	251- 500	2512	533	740	294	485	194	266
5	501- 750	786	180	165	50	168	125	98
6	751-1000	335	93	55	20	64	66	37
7	1001-1500	161	36	36	16	51	15	7
8	1501-2000	63	13	9	8	17	6	10
9	2001-3000	24	5	3	5	7	2	2
percentage								
10	all groups	100	100	100	100	100	100	100
11	upto 150	11.8	13.8	7.7	12.1	4.6	18.0	16.6
12	151- 250	34.2	28.2	35.2	23.7	25.7	44.2	45.2
13	251- 500	35.0	36.0	41.9	48.0	42.7	17.9	24.2
14	501- 750	10.9	12.1	9.3	8.2	14.8	11.6	8.9
15	751-1000	4.7	6.3	3.1	3.3	5.6	6.1	3.4
16	1001-1500	2.2	2.4	2.0	2.6	4.5	1.4	0.6
17	1501-2000	0.9	0.9	0.5	1.3	1.5	0.6	0.9
18	2001-3000	0.3	0.3	0.3	0.8	0.6	0.2	0.2

25.6 Among the 7178 scientists who had reported salaries, there were 1278 who had doctorate degrees, and 5900 who had only a master's degree. In Table T.29 below is given the distribution of scientists by salary group and level of education.

Table T.29: Percentage distribution of scientists by salary group and level of education

sl. no.	level of education salary group(Rs)	all sub-jects	mathe-matics	phy-sics	geo-logy	chemi-stry	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
both level								
1	upto 150	11.7	13.8	7.7	12.1	4.6	13.0	16.6
2	250	45.9	42.0	43.0	35.8	30.3	62.3	61.7
3	500	80.9	77.9	84.8	83.8	73.0	80.2	86.0
4	750	91.8	90.1	94.2	92.0	87.8	91.8	94.9
5	1000	96.5	96.4	97.3	95.3	93.4	97.9	98.3
6	1500	98.8	98.8	99.3	97.9	98.9	99.3	98.9
7	2000	99.7	99.7	99.8	99.2	99.4	99.8	99.8
8	3000	100	100	100	100	100	100	100
master's degree								
9	upto 150	14.2	15.9	9.0	13.3	6.8	21.9	20.0
10	250	54.1	46.9	48.9	39.2	42.2	71.3	71.7
11	500	88.1	83.9	90.7	90.0	80.7	89.1	93.7
12	750	95.6	94.0	97.1	96.4	92.2	94.9	98.1
13	1000	98.5	98.4	99.0	97.7	96.0	99.4	99.7
14	1500	99.5	99.7	99.8	99.1	98.8	99.6	99.8
15	2000	99.9	99.9	100	99.8	99.7	99.8	100
16	3000	100	100	100	100	100	100	100
doctor's degree								
17	upto 150	0.3	1.0	0.4	-	0.3	-	-
18	250	8.4	12.0	6.8	-	7.0	6.3	14.2
19	500	47.6	41.6	49.0	19.6	57.9	38.7	48.9
20	750	74.8	66.5	76.3	44.6	79.2	70.0	79.5
21	1000	87.2	83.7	86.7	67.9	88.3	90.6	91.6
22	1500	95.2	93.3	96.4	82.1	96.1	97.9	94.7
23	2000	98.4	97.6	98.8	92.9	98.7	99.5	98.9
24	3000	100	100	100	100	100	100	100

25.7 Fiftyfour per cent of the master scientists had salaries of Rs. 250 or less per month against a little more than eight percent of the doctors. While only a little over 4 percent of masters were getting salaries above Rs. 750 per month, more than 25 percent of doctors were included in this group. Salaries above Rs. 1000 were received by only half of one percent of master scientists but by nearly 5 percent of doctor scientists. Thus doctor scientists were much better rewarded on the whole than those who had only a master's degree.

25.8 Mean basic monthly salary of scientists is presented in the following Table T.29 by age and function and also by age and level of education.

Table T.30 : Mean basic salary of all scientists by age group and function and by age group and level of education.

sl. no.	age group	all reporting salary	functions			level of education		
			teaching	research	technical	administrative	master	doctor
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
rupees per month								
1.	all ages	383	345	438	376	1059	336	640
2.	21 - 25	192	188	185	201	-	190	272
3.	26 - 30	229	218	223	250	290	223	336
4.	31 - 35	341	283	361	366	727	319	451
5.	36 - 40	428	372	428	420	1013	401	544
6.	41 - 45	526	434	517	470	1101	482	651
7.	46 - 50	607	505	656	592	1232	553	745
8.	51 - 55	720	584	812	716	1319	611	937
9.	56 - 60	840	655	921	828	1511	708	1096
10.	over 60	8966	744	1158	1030	1741	820	1163

25.9 From col.(f) it is seen that the average scientist enters his career between the age 21-25 starting with a basic monthly salary of Rs.192 per month. His average salary shows a modest rise to Rs. 229 in the next quinquennial age group 26-30. With a decade of work behind him, his average salary is Rs. 341, in the age group 31-35. Each succeeding 5 years brings up the average salary to Rs. 428, 526, 607, 720 and finally to Rs. 840 in the age group 56-60 which is generally the retiring age for most persons. With minor variations, the picture remains the same for teaching, research, and technical functions; but there is a striking difference in the 'administrative' group.

25.10 The scientist with administrative functions enters his career in the age group 26-30, with an average salary of Rs.290. In the next five years his salary becomes Rs. 727 which is twice as much as that for his colleagues who perform teaching, research or technical functions. In the age group 36-40 the administrative scientist gets Rs. 1013 against Rs. 372 of the scientist who is teaching, Rs. 428 of one who is engaged in research, and

Rs. 420 of one who performs technical functions. In the age group 46-50, his salary rises to Rs. 1232 which is much higher than of those engaged in teaching (Rs. 505), research (Rs. 656) and technical work (Rs. 592). In the age group 56-60, the average salary amounts to Rs. 1511 for administrative scientists which is much larger than the corresponding salary for scientists engaged in teaching, research and technical functions of Rs. 846, Rs. 590, and Rs. 683 per month respectively. As a larger proportion of scientists performing administrative functions belong to higher age group, the average monthly salary of this group of scientists is as high as Rs. 1059 per month against the overall average of Rs. 383 for all scientists. The general conclusion is inescapable that administrative work seems to be valued most highly even in respect of scientists.

25.11 The relative advantage in salary enjoyed by doctor scientists as compared to master scientists is brought out in the last two columns 7 and 8 of the same Table T.29. Broadly speaking, in each age group the average salary of a doctor scientist is 50 per cent higher than that of a 'master' scientist. The overall average is Rs. 640 per month for doctors as against Rs. 336 for the masters, which is to be accounted for partly by the higher salary in each age group and partly by the larger proportion of older scientists among doctors.

25.12 Mean salary of scientists by age and subjects displays certain interesting features which are shown in the following Table T.30.

Table T.31 : Mean basic monthly salary of scientists by age and subject.

Sl. no.	all subjects	mathe- matics	phy- sics	geo- logy	che- mistry	botany	zoology	
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
rupees per month								
1.	all ages	333	370	365	375	451	303	295
2.	21 - 25	192	190	203	219	181	181	174
3.	26 - 30	229	234	236	281	236	203	198
4.	31 - 35	341	318	334	386	381	252	260
5.	36 - 40	428	406	410	536	473	321	378
6.	41 - 45	526	477	478	690	595	375	430
7.	46 - 50	607	565	541	854	685	496	497
8.	51 - 55	720	619	654	969	839	625	619
9.	56 - 60	840	753	803	1985	896	767	613
10.	over 60	966	937	847	1433	997	980	1020

The mean salary of mathematicians at each age was below the average for all scientists. A similar remark applies to physicists over 30 and botanists and zoologists below 60 years in age. A chemist though getting much below the average pay at the beginning of his career, makes rapid progress with age and is second only to the geologists in average pay. Geologists start their career with a mean salary much above the average which rises rapidly and reaches a level much higher than others towards the close of their career.

CHAPTER SEVEN

Specialisation

26. Specialisation and level of education : The following table T.31 shows the percentage of registered scientists belonging to each subject field, who reported specialisation. For all subjects except chemistry, specialisation related to a relatively narrow branch of knowledge such as, for example, analysis or geometry in mathematics; electronics, nuclear physics or optics and spectroscopy in physics; petrology, geophysics or paleontology in geology; cytology, morphology or mycology in botany; and entomology, marine biology or helminthology in zoology. In the case of chemistry, specialisation seems to have been conceived in much broader terms such as biological chemistry, general and physical chemistry, industrial chemistry and chemical technology, inorganic chemistry, organic chemistry or pharmaceutical chemistry. Because of this broader concept of specialisation, all the chemists were able to mention some specialisation or the other. Including chemists, 90 per cent of the registered doctors and 71 per cent of the masters mentioned specialisation. If chemists (among whom 100 per cent reported specialisation) are excluded, the percentage reporting specialisation is brought down to 83 for doctors and 55 for masters.

Table T.31 : Number and percentage of scientists having specified branch of specialisation, by subject field and level of education.

sl. no.	all subjects		maths. and statisticians	phy-sics	geo-logy	chem. and chem. tech.	bota-ny	zoo-logy	
	without chemi-stry	with chemi-stry							
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
all registered									
1. both levels	7835	12351	2069	2182	854	4516	1346	1384	
2. masters	6853	10743	1810	1927	798	3890	1139	1179	
3. doctors	982	1608	259	255	56	626	207	205	
number reporting specialisation									
4. both levels	4558	9074	1298	1217	374	4516	787	882	
5. masters	3739	7629	1097	974	324	3890	645	699	
6. doctors	819	1445	201	243	50	626	142	183	
percent reporting specialisation									
7. both levels	58.3	73.5	62.7	55.8	46.6	100.0	58.5	63.7	
8. masters	54.6	71.0	60.1	50.5	40.6	100.0	56.6	59.3	
9. doctors	83.4	89.9	77.6	95.3	89.3	100.0	68.6	89.3	

27.1 Specialisation within a subject: The distribution of scientists reporting specialisation is shown in Table T.32; for each of the six subjects. For each subject, the first row gives figures of all registered masters, doctors and both levels. Out of all registered, the number reporting specialisation is given in the next row. The subsequent rows show the breakdown of this total by individual branch of specialisation. The last row shows the number not reporting specialisation.

27.2 Percentages in columns 5, 6 and 7 are shown in two ways. The figures within brackets are percentages with 'all registered' as 100. These give the proportion of those reporting specialisation and not reporting specialisation. The other figures are percentages with 'number reporting specialisation' as 100 and are given to indicate the relative importance of different branches of specialization.

T. 32 : Distribution of scientists by branch of specialisation and level of education.

sl. no.	branch of specialization	number			percent			doctor percent both lev
		both level	master	doctor	both level	master	doctor	
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1. mathematics and statistics								
1	all registered	2069	1810	259	(100)	(100)	(100)	12.5
2	reporting specialization	1298	1097	201	100	100	100	15.5
					(62.7)	(60.1)	(77.6)	
3	algebra and theory of numbers	65	50	15	5.0	4.6	7.5	23.1
4	analysis	78	51	27	6.0	4.6	13.4	34.6
5	geometry	105	71	34	8.1	6.5	16.9	32.4
6	applied mathematics	331	249	82	25.5	22.7	40.8	24.8
7	statistics	702	663	39	54.1	60.4	19.4	5.6
8	other specialists	17	13	4	1.3	1.2	2.0	23.6
9	not reporting spec specialists	771	713	58	(37.3)	(39.9)	(22.4)	7.5
p h y s i c s								
10	all registered	2182	1927	255	(100)	(100)	(100)	11.7
11	reporting specialists	1217	974	243	100	100	100	20.0
					(55.8)	(50.5)	(95.3)	
12	electronics	505	407	98	41.5	41.8	40.3	19.4
13	optics & spectroscopy	322	263	59	26.5	27.0	24.3	18.3
14	crystallography	34	29	5	2.8	3.0	2.1	14.7
15	acoustics	30	25	5	2.5	2.6	2.1	16.7
16	nuclear physics	132	96	36	10.8	9.8	14.8	27.3
17	theoretical physics	39	32	7	3.2	3.3	2.9	17.9
18	applied physics	95	77	18	7.8	7.9	7.4	18.9
19	meteorology	50	40	10	4.1	4.1	4.0	20.0
20	geophysics	10	5	5	0.8	0.5	2.1	50.0
21	not reporting specialisation	965	953	12	(44.2)	(49.5)	(4.7)	1.2

branch of specialisation	number			percent			doctor as percent of both level
	both level	master	doctor	both level	master	doctor	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
3. geology							
22 all registered	854	798	56	(100)	(100)	(100)	6.6
23 number reporting specialist	374	324	50	100 (43.8)	100 (40.6)	100 (89.4)	11.9
24 geodesy	12	12	-	3.2	3.7	-	-
25 seismology	3	3	-	0.8	0.9	-	-
26 oceanography	14	12	2	3.7	3.7	4.0	14.3
27 petrology	74	54	20	19.8	16.7	40.0	27.0
28 hydrology	16	15	1	4.3	4.6	2.0	6.3
29 tectonophysics.	10	10	-	2.7	3.1	-	-
30 geophysics - general	66	64	2	17.7	19.8	4.0	3.0
31 economic geology	38	36	2	10.2	11.1	4.0	5.3
32 petroleum	17	14	3	4.5	4.3	6.0	17.6
33 structural geology	3	3	-	0.8	0.9	-	-
34 minerology	16	12	4	4.3	3.7	8.0	25.0
35 petrography	61	56	5	16.3	17.3	10.0	8.2
36 stratigraphy	5	4	1	1.3	1.2	2.0	20.0
37 paleontology.	36	27	9	9.6	8.4	18.0	25.0
38 petrography	3	2	1	0.8	0.6	2.0	33.3
39 not reporting specialisation	480	474	6	(56.2)	(59.4)	10.6	4.3
5. Chemistry							
40 all registered	4516	3890	626	100	100	100	13.8
41 biological chemistry	433	302	131	9.6	7.8	20.9	30.2
42 general & physical chemistry.	720	578	142	15.9	14.9	22.7	19.7
43 ind.chem. & chem. technology	1865	1744	121	41.3	44.8	19.3	6.4
44 inorganic chemistry	357	320	37	7.9	8.2	5.9	10.4
45 organic chemistry	902	726	176	20.0	18.7	28.2	19.5
46 pharmaceutical chemistry	239	220	19	5.3	5.6	3.0	7.9

(contd...)

sl. no.	branch of specialization	number			percent			doctor as percent of both level
		both level	master	doctor	both level	master	doctor	
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
b o t a n y								
47	all registered	1346	1139	207	(100)	(100)	(100)	15.4
48	all reporting specialisation	787	645	142	(58.5)	(56.6)	(68.6)	18.0
49	plant pathology	164	140	24	20.8	21.6	17.0	14.6
50	cytology	119	88	31	15.1	13.7	21.9	25.1
51	plant physiology	116	92	24	14.7	14.3	16.9	20.7
52	agricultural botany	48	39	9	6.1	6.1	6.3	18.8
53	embryology	57	46	11	7.2	7.1	7.7	19.3
54	ecology	40	32	8	5.1	5.0	5.6	20.0
55	morphology	73	59	14	9.3	9.1	9.9	19.2
56	bacteriology	39	36	3	5.0	5.6	2.1	7.7
57	plant breeding	43	38	5	5.5	5.9	3.5	11.6
58	paleo botany	26	19	7	3.3	3.0	4.9	26.9
59	forestry	23	23	-	2.9	3.6	-	-
60	herbarium	29	25	4	3.7	3.9	2.8	13.8
61	algology	10	8	2	1.3	1.2	1.4	20.0
62	not reporting specialisation	559	494	65	(41.5)	(43.4)	(30.4)	11.6
z o o l o g y								
63	all registered	1384	1179	205	(100)	(100)	(100)	14.8
64	all reporting specialisation	882	699	183	(63.7)	(59.3)	(89.3)	20.7
65	entomology	356	293	63	40.5	41.9	34.4	17.7
66	fishery & marine biology	260	231	29	29.5	33.0	15.8	11.1
67	morphology	37	25	12	4.2	3.6	6.7	32.4
68	parasitology	48	31	17	5.4	4.4	9.4	35.4
69	amphibiology	4	-	4	0.5	-	2.2	100.0
70	cytology	55	26	29	6.2	3.8	15.8	52.7
71	mamalogy	14	6	8	1.6	0.9	4.4	57.1
72	nematology	21	19	2	2.4	2.8	1.1	9.5
73	embryology	18	13	5	2.0	1.9	2.7	27.8
74	protozoology	17	13	4	1.9	1.9	2.2	23.5
75	ecology	3	3	-	0.3	0.4	-	-
76	carcinology	9	8	1	1.0	1.1	0.5	1.1
77	economic zoology	8	8	-	0.9	1.1	-	-
78	malariology	11	8	3	1.2	1.1	1.6	27.3
79	physiology	10	8	2	1.1	1.1	1.1	20.0
80	museology	5	4	1	0.6	0.6	0.5	20.0
81	genetics	6	3	3	0.7	0.4	1.6	50.0
82	not reporting specialisation	502	480	22	(36.3)	(40.7)	(10.7)	(4.4)

STATISTICAL
TABLES

Table 1: Outturn of scientists in India, 1910-1955

sl. no.	year	all subjects	mathematics	physics	geology	chemistry	botany	zoology
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	1910	36	10	6	2	11	4	3
2	1911	57	12	8	4	25	5	3
3	1912	77	25	17	7	22	4	2
4	1913	9	30	25	5	23	4	7
5	1914	121	56	33	8	16	4	4
6	1915	136	56	32	7	23	8	10
7	1916	183	75	46	6	36	6	4
8	1917	181	87	51	5	19	9	10
9	1918	163	92	35	4	15	12	5
10	1919	169	71	56	3	19	13	7
11	1920	160	53	33	4	51	12	7
12	1921	159	47	36	5	59	8	4
13	1922	187	60	34	7	68	9	9
14	1923	205	60	40	6	70	17	12
15	1924	206	49	38	8	80	14	17
16	1925	251	66	51	9	75	25	25
17	1926	313	82	65	11	75	32	48
18	1927	367	97	85	9	91	26	59
19	1928	471	126	94	10	102	74	65
20	1929	521	145	104	8	106	88	50
21	1930	509	138	118	14	102	76	61
22	1931	539	149	121	27	118	65	59
23	1932	535	162	123	38	113	42	57
24	1933	579	183	137	44	120	39	56
25	1934	622	208	131	56	100	58	69
26	1935	565	162	129	45	115	51	63
27	1936	584	164	132	38	136	57	57
28	1937	577	168	140	29	129	52	59
29	1938	599	166	126	31	170	51	55
30	1939	613	159	120	40	189	53	52
31	1940	610	163	129	41	159	57	61
32	1941	637	174	132	37	174	63	57
33	1942	685	168	146	39	209	59	64
34	1943	699	181	157	42	208	48	63
35	1944	747	196	166	41	230	55	59
36	1945	786	203	152	47	260	60	64
37	1946	824	197	160	53	287	58	69
38	1947	901	213	150	53	363	57	65
39	1948	925	234	162	63	345	61	60
40	1949	939	227	176	76	333	58	67
41	1950	1083	240	192	74	395	81	101
42	1951	1444	292	221	71	598	105	157
43	1952	1693	373	346	72	551	152	199
44	1953	2104	465	411	88	711	188	241
45	1954	2432	606	498	108	711	255	254
46	1955	2659	633	533	155	957	222	259
47	1910-1955	28947	7533	5897	1552	8669	2497	2799

Source: Annual Reports and Calenders of Universities.

Table 2: Distribution of scientists enrolled in the National Register by age-group, subject and level of education, 1955

sl. no.	age-group	all subjects	mathe-	phy-	geo-	chemis-	botany	zoo-
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
both level								
1	all ages	2351	2069	2182	854	4516	1346	1384
2	21-25	2528	430	513	324	554	338	319
3	26-30	3331	436	532	254	1275	393	441
4	31-35	2275	362	392	123	978	188	232
5	36-40	1342	241	245	56	556	117	127
6	41-45	1037	179	177	34	486	95	96
7	46-50	768	130	139	27	318	82	72
8	51-55	563	105	114	18	204	64	58
9	56-60	319	84	45	10	114	45	21
10	over 60	158	52	25	8	31	24	18
master degree								
11	all ages	10742	1810	1927	798	3890	1139	1179
12	21-25	2503	476	507	322	547	335	316
13	26-30	3194	422	506	246	1217	378	425
14	31-35	1927	326	338	111	824	143	185
15	36-40	1091	207	208	47	460	80	89
16	41-45	800	138	130	27	380	60	65
17	46-50	554	92	107	20	238	50	47
18	51-55	370	70	90	14	129	33	29
19	56-60	211	51	29	6	77	35	13
20	over 60	93	28	12	5	18	20	10
doctor degree								
21	all ages	1608	259	255	56	626	207	205
22	21-25	25	4	6	2	7	3	3
23	26-30	137	14	26	8	58	15	16
24	31-35	343	36	54	12	154	45	47
25	36-40	251	34	37	9	96	37	38
26	41-45	267	41	47	7	106	35	31
27	46-50	214	38	32	7	80	32	25
28	51-55	193	35	24	4	75	26	29
29	56-60	108	33	16	4	37	10	8
30	over 60	65	24	13	3	13	4	8

Source: National Register Unit, CSIR.

Table 8 : Distribution of registered scientists by subject-age-group and employment status and of those employed by sectors of employment : National Register as of 1955 end.

sl. no	age - group	all subjects	mathe- matics	phy- sics	geo- logy	chemi- stry	bo- tany	zoölogy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
all registered								
1.	all ages	12351	2069	2132	854	455	1346	1384
2.	21 - 25	2528	480	513	324	554	338	319
3.	26 - 30	3351	436	532	254	1275	393	441
4.	31 - 35	2275	362	392	123	978	188	232
5.	36 - 40	1342	241	245	56	556	117	127
6.	41 - 45	1067	179	177	34	486	95	96
7.	46 - 50	763	130	139	27	318	82	72
8.	51 - 55	563	105	114	18	204	64	58
9.	56 - 60	319	84	45	10	114	45	21
10.	over 60	153	52	25	8	31	24	18
all employed								
11.	all ages	10070	1619	1872	686	3597	1131	1165
12.	21 - 25	1330	236	267	211	218	215	183
13.	26 - 30	2587	317	483	211	840	341	395
14.	31 - 35	2111	328	390	122	881	170	220
15.	36 - 40	1301	235	244	55	529	113	125
16.	41 - 45	1047	175	175	33	473	95	96
17.	46 - 50	755	128	137	27	309	82	72
18.	51 - 55	558	103	114	18	202	64	57
19.	56 - 60	276	56	41	5	114	38	12
20.	over 60	105	51	21	4	31	13	5
educational institutions								
21.	all ages	4746	687	1001	211	1348	638	661
22.	21 - 25	675	112	151	76	99	137	98
23.	26 - 30	1290	153	265	57	356	178	266
24.	31 - 35	952	181	198	35	329	84	102
25.	36 - 40	535	113	99	16	187	59	61
26.	41 - 45	401	99	81	5	111	56	49
27.	46 - 50	372	78	88	9	111	48	38
28.	51 - 55	293	61	72	9	83	40	33
29.	56 - 60	177	52	31	3	56	26	9
30.	over 60	68	20	16	1	16	10	5
government departments								
31.	all ages	2114	296	581	277	534	194	232
32.	21 - 25	263	43	54	75	20	29	42
33.	26 - 30	543	60	138	102	116	64	63
34.	31 - 35	450	58	127	49	126	35	55
35.	36 - 40	325	52	119	15	89	23	27
36.	41 - 45	255	40	73	17	91	16	18
37.	46 - 50	142	24	31	12	47	13	15
38.	51 - 55	103	14	34	5	30	13	12
39.	56 - 60	21	3	4	1	12	1	-
40.	over 60	7	2	1	1	3	-	-

sl. no.	age - group	all subject	mathe- matic	phy- sics	geo- logy	chemi- stry	bo- tany	zoology
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
industry								
41.	all ages	981	72	39	101	744	121	13
42.	21 - 25	48	8	3	18	18	1	-
43.	26 - 30	150	13	3	27	102	3	2
44.	31 - 35	230	17	7	23	176	2	5
45.	36 - 40	155	10	4	17	120	3	1
46.	41 - 45	188	8	9	8	159	1	3
47.	46 - 50	106	7	9	4	86	-	-
48.	51 - 55	60	5	3	2	48	1	1
49.	56 - 60	36	2	1	-	31	1	1
50.	over 60	8	2	-	2	4	-	-
laboratories, government								
51.	all ages	1700	229	130	89	835	204	213
52.	21 - 25	244	56	23	38	74	27	32
53.	26 - 30	459	51	34	22	233	69	50
54.	31 - 35	391	42	37	14	214	38	46
55.	36 - 40	225	37	14	7	114	21	32
56.	41 - 45	165	18	9	3	95	15	25
57.	46 - 50	106	11	4	2	56	16	17
58.	51 - 55	72	13	5	2	33	9	10
59.	56 - 60	28	4	3	1	13	6	1
60.	over 60	10	3	1	-	3	3	-
laboratories, private								
61.	all ages	529	135	121	8	136	83	46
62.	21 - 25	102	23	36	4	7	21	11
63.	26 - 30	145	25	43	3	33	27	14
64.	31 - 35	108	27	21	1	36	11	12
65.	36 - 40	61	23	8	-	19	7	4
66.	41 - 45	38	10	3	-	17	7	1
67.	46 - 50	29	8	5	-	9	5	2
68.	51 - 55	20	10	-	-	8	1	1
69.	56 - 60	14	5	2	-	2	4	1
70.	over 60	12	4	3	-	5	-	-
unemployed								
71.	all ages	2180	409	302	159	917	197	196
72.	21 - 25	1198	244	246	113	336	123	136
73.	26 - 30	744	119	49	43	435	52	46
74.	31 - 35	164	34	2	1	97	18	12
75.	36 - 40	41	6	1	1	27	4	2
76.	41 - 45	20	4	2	1	13	-	-
77.	46 - 50	13	2	2	-	9	-	-
retired								
78.	all ages	101	41	8	9	2	18	23
79.	51 - 55	5	2	-	-	2	-	1
80.	56 - 60	43	18	4	5	-	7	9
81.	over 60	53	21	4	4	-	11	13

Source: National Register Unit, CSIR.

Table 4: Distribution of registered employed scientists by subject, function performed and sectors of employment, 1955

sl. no.	function performed	all subjects	mathe- matics	phy- sics	geo- logy	chenis- try	botany	zoo- logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
all employed								
1	all functions	10070	1619	1872	686	3597	1131	1165
2	teaching	4354	857	963	163	1147	608	616
3	research	2362	199	392	120	1067	300	284
4	technical	2898	516	478	376	1097	196	235
5	administrative	456	47	39	27	286	27	30
educational institutions								
6	all functions	4746	887	1001	211	1348	638	661
7	teaching	4251	832	947	163	1129	586	594
8	research	465	53	53	48	194	52	65
9	technical	8	-	-	-	8	-	-
10	administrative	22	2	1	-	17	-	2
government departments								
11	all functions	2114	296	581	277	534	194	232
12	teaching	50	5	13	-	8	13	11
13	research	313	7	114	3	98	41	50
14	technical	1549	266	437	256	302	131	157
15	administrative	202	18	17	18	126	9	14
industry								
16	all functions	981	72	39	101	744	12	13
17	teaching	-	-	-	-	-	-	-
18	research	65	14	10	-	37	2	2
19	technical	802	49	24	95	623	5	6
20	administrative	114	9	5	6	84	5	5
laboratories, government								
21	all functions	1700	229	130	89	835	204	213
22	teaching	35	8	3	-	9	7	9
23	research	1214	74	112	62	672	155	139
24	technical	366	137	6	24	106	34	59
25	administrative	84	10	9	3	48	8	6
laboratories, private								
26	all functions	529	135	121	8	136	93	46
27	teaching	17	12	-	-	1	2	2
28	research	305	51	103	7	66	50	28
29	technical	173	64	11	1	58	26	13
30	administrative	34	8	7	-	11	5	3

Source: National Register Unit, CSIR.

Table 5: Distribution of employed scientists by age-group, function performed and subjects, 1955

sl. no.	age group	all subjects	mathematics	physics	geology	chemistry	botany	zoology
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
all functions								
1	all ages	10070	1619	1372	686	3597	1131	1165
2	21-25	1330	236	267	211	213	215	183
3	26-30	2537	217	433	211	940	341	395
4	31-35	2111	223	390	122	831	170	220
5	36-40	1801	233	244	55	529	113	125
6	41-45	1047	175	175	33	473	95	96
7	46-50	755	123	137	27	309	82	72
8	51-55	558	107	114	18	202	64	57
9	56-60	276	66	41	5	114	38	12
10	over 60	105	31	21	4	31	13	5
teaching								
11	all ages	4354	537	963	163	1147	603	616
12	21-25	480	97	112	35	51	104	81
13	26-30	1504	163	235	50	263	173	222
14	31-35	905	136	205	35	238	90	101
15	36-40	539	111	110	16	177	61	64
16	41-45	409	93	89	5	111	53	53
17	46-50	374	70	90	9	107	43	44
18	51-55	321	66	76	9	83	40	37
19	56-60	167	31	29	3	54	25	9
20	over 60	69	24	17	1	13	9	5
research								
21	all ages	2562	199	392	120	1067	300	284
22	21-25	499	53	107	73	118	84	59
23	26-30	747	40	132	23	354	95	98
24	31-35	431	29	67	8	275	45	53
25	36-40	246	27	32	1	131	26	29
26	41-45	172	20	21	2	93	17	19
27	46-50	114	11	16	2	56	17	12
28	51-55	65	10	7	1	29	8	8
29	56-60	33	8	6	-	9	6	1
30	over 60	10	2	4	-	2	2	-

Table 5 contd.

(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
technical								
31	all ages	2398	516	478	376	1097	196	235
32	21-25	347	86	43	98	45	27	43
33	26-30	690	113	111	133	174	73	74
34	31-35	654	108	112	77	266	35	56
35	36-40	457	91	98	31	182	26	29
36	41-45	360	43	59	19	201	18	15
37	46-50	204	35	25	11	114	9	10
38	51-55	119	22	21	5	55	8	8
39	56-60	43	11	4	-	33	-	-
40	over 60	11	2	-	2	7	-	-
administrative								
41	all ages	456	47	39	27	236	27	30
42	21-25	4	-	-	-	4	-	-
43	26-30	38	3	5	-	29	-	1
44	31-35	71	6	6	2	52	-	5
45	36-40	59	6	4	7	39	-	3
46	41-45	106	14	6	7	68	2	9
47	46-50	63	6	6	5	32	3	6
48	51-55	65	5	10	3	35	8	4
49	56-60	35	4	2	2	18	7	2
50	over 60	15	3	-	1	9	2	-

Source: National Register Unit, CSIR.

Table 6 : Distribution of scientists reporting salary by age-group salary-group and subjects as of 1955 end.

sl. no.	age group	salary group (Rs. per month)								
		all	upto 150	151-250	251-500	501-750	751-1000	1001-1500	1501-2000	2001-3000
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
all subjects										
1	all ages	7173	844	2453	2512	786	33	161	63	24
2	21-25	1024	239	555	171	9	-	-	-	-
3	26-30	1916	339	978	511	37	1	-	-	-
4	31-35	1481	110	541	663	123	32	7	-	-
5	36-40	837	40	170	455	163	43	14	2	-
6	41-45	669	8	107	321	155	50	24	4	-
7	46-50	529	7	64	213	113	72	43	12	-
8	51-55	432	-	33	129	123	80	41	23	3
9	56-60	175	-	3	36	48	41	21	14	12
10	over 60	65	1	2	8	10	16	11	8	9
mathematics										
11	all ages	1482	204	418	533	180	93	36	13	5
12	21-25	222	76	106	40	-	-	-	-	-
13	26-30	303	85	123	36	8	1	-	-	-
14	31-35	320	29	101	140	32	16	2	-	-
15	36-40	220	3	39	106	45	16	6	-	-
16	41-45	147	3	25	69	32	14	3	1	-
17	46-50	108	3	14	48	17	15	10	1	-
18	51-55	93	-	8	30	27	12	8	6	2
19	56-60	50	-	1	12	15	13	4	3	2
20	over 60	19	-	1	2	4	6	3	2	1
physics										
21	all ages	1763	137	623	740	165	55	36	9	3
22	21-25	233	36	172	24	1	-	-	-	-
23	26-30	466	75	226	162	3	-	-	-	-
24	31-35	382	13	118	213	34	4	-	-	-
25	36-40	228	4	46	129	38	8	3	-	-
26	41-45	164	4	24	89	35	6	6	-	-
27	46-50	129	4	22	55	23	12	11	2	-
28	51-55	110	-	12	47	22	15	10	3	1
29	56-60	37	-	2	15	7	6	4	2	1
30	over 60	19	1	1	6	2	4	2	2	1

Table 6 contd.

(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
geology										
31	all ages	612	74	145	294	50	20	16	8	5
32	21-25	174	44	68	60	2	-	-	-	-
33	26-30	198	20	50	124	4	-	-	-	-
34	31-35	115	9	20	65	17	3	1	-	-
35	36-40	51	1	2	26	13	1	3	1	-
36	41-45	29	-	2	9	8	4	5	1	-
37	46-50	24	-	2	8	4	3	3	4	-
38	51-55	15	-	1	2	2	5	3	2	-
39	56-60	4	-	-	-	-	-	1	-	3
40	over 60	2	-	-	-	-	-	-	-	2
chemistry										
41	all ages	1137	52	293	495	168	64	51	17	7
42	21-25	43	16	21	9	2	-	-	-	-
43	26-30	237	32	110	76	19	-	-	-	-
44	31-35	280	3	79	166	23	5	4	-	-
45	36-40	160	1	37	82	21	6	2	1	-
46	41-45	150	-	23	73	33	12	7	2	-
47	46-50	117	-	16	52	25	10	12	2	-
48	51-55	97	-	7	23	26	21	16	4	-
49	56-60	38	-	-	4	9	9	6	6	4
50	over 60	10	-	-	-	-	1	4	2	3
botany										
51	all ages	1081	195	478	194	125	66	15	6	2
52	21-25	198	64	101	29	4	-	-	-	-
53	26-30	332	37	218	24	3	-	-	-	-
54	31-35	169	31	117	13	5	3	-	-	-
55	36-40	108	12	23	57	11	5	-	-	-
56	41-45	89	1	16	38	23	10	1	-	-
57	46-50	80	-	3	22	23	19	6	2	-
58	51-55	61	-	-	9	32	16	3	1	-
59	56-60	34	-	-	2	15	10	4	2	1
60	over 60	10	-	-	-	4	3	1	1	1
zoology										
61	all ages	1093	182	496	266	98	37	7	10	2
62	21-25	149	53	87	9	-	-	-	-	-
63	26-30	380	90	251	39	-	-	-	-	-
64	31-35	215	25	106	71	12	1	-	-	-
65	36-40	120	14	23	55	25	3	-	-	-
66	41-45	90	-	17	43	24	4	2	-	-
67	46-50	71	-	7	23	21	13	1	1	-
68	51-55	56	-	5	18	14	11	1	7	-
69	56-60	12	-	-	3	2	3	2	1	1
70	over 60	5	-	-	-	-	2	1	1	1

Source: National Register Unit, CSIR

Table 7: Distribution of scientists reporting salary by age group function performed and subject, 1955.

sl. no.	age-group	all sub-jects	mathe-matics	phy-sics	geo-logy	chemis-try	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
all functions								
1	all ages	7173	1432	1763	614	1137	1031	1098
2	21-25	1024	222	233	174	48	193	149
3	26-30	1916	303	466	193	237	332	300
4	31-35	1431	320	332	115	230	169	215
5	36-40	307	220	228	51	160	103	120
6	41-45	669	147	164	29	150	39	90
7	46-50	529	103	109	24	117	30	71
8	51-55	432	93	110	15	97	61	56
9	56-60	175	50	37	4	38	34	12
10	over 60	65	19	19	2	10	10	5
teaching								
11	all ages	3463	793	919	155	421	592	533
12	21-25	393	95	100	32	14	95	62
13	26-30	399	154	227	45	33	172	213
14	31-35	705	183	200	35	98	90	99
15	36-40	410	104	102	16	66	60	62
16	41-45	317	30	85	5	38	57	52
17	46-50	307	63	89	9	49	43	44
18	51-55	267	64	74	9	44	39	37
19	56-60	114	31	27	3	21	23	9
20	over 60	46	14	15	1	3	3	5
research								
21	all ages	1403	172	358	39	230	237	272
22	21-25	339	48	93	46	18	30	54
23	26-30	443	35	124	23	71	94	96
24	31-35	269	27	65	9	66	45	57
25	36-40	139	26	29	6	25	25	23
26	41-45	36	12	13	2	22	15	17
27	46-50	69	10	14	2	14	17	12
28	51-55	40	7	7	1	12	6	7
29	56-60	15	5	4	-	1	4	1
30	over 60	3	2	4	-	1	1	-

contd.

table 7 contd

(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
technical								
31	all ages	2039	475	457	351	410	180	216
32	21-25	237	79	40	96	57	23	33
33	26-30	559	111	110	130	72	66	70
34	31-35	432	106	111	70	106	34	55
35	36-40	314	35	93	23	63	23	27
36	41-45	219	42	56	16	74	17	14
37	46-50	120	24	22	11	45	9	9
38	51-55	79	18	21	3	21	3	3
39	56-60	25	10	4	-	11	-	-
40	over 60	4	-	-	2	2	-	-
administrative								
41	all ages	220	42	34	19	76	22	27
42	21-25	-	-	-	-	-	-	-
43	26-30	15	3	5	-	6	-	1
44	31-35	25	4	6	1	10	-	4
45	36-40	24	5	4	6	6	-	3
46	41-45	47	13	5	6	16	-	7
47	46-50	33	6	4	2	9	6	6
48	51-55	46	4	3	2	20	3	4
49	56-60	22	4	2	2	5	7	2
50	over 60	3	3	-	-	4	1	-

Source: National Register Unit, CSIR.

Table 8: Mean salary of scientists reporting salary by age-group function performed and subject.

sl. no.	age-group	mean salary						
		all sub-jects	mathe-matics	phy-sics	geo-logy	chemis-try	botany	zoo-logy
(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
all functions								
1	all ages	383	370	365	375	451	303	295
2	21-25	192	190	203	219	181	131	174
3	26-30	229	234	236	231	236	203	193
4	31-35	341	313	334	386	331	252	260
5	36-40	423	406	410	536	473	321	378
6	41-45	526	477	473	690	595	375	430
7	46-50	607	565	541	854	685	496	497
8	51-55	720	619	654	969	839	625	619
9	56-60	840	753	803	1935	396	767	613
10	over 60	966	937	847	1433	997	980	1020
teaching								
11	all ages	345	351	321	356	406	293	296
12	21-25	183	197	192	207	133	131	176
13	26-30	218	217	216	246	243	200	197
14	31-35	233	279	297	314	331	242	249
15	36-40	372	373	358	414	402	299	362
16	41-45	434	414	386	662	530	362	396
17	46-50	505	539	418	693	538	451	447
18	51-55	584	583	483	814	655	567	580
19	56-60	665	642	598	825	734	607	623
20	over 60	744	697	606	500	826	813	1020
research								
21	all ages	438	342	362	287	366	271	272
22	21-25	185	197	214	130	175	184	180
23	26-30	223	262	231	238	222	213	209
24	31-35	361	329	377	333	391	281	279
25	36-40	423	393	484	613	454	263	389
26	41-45	517	468	651	720	531	410	401
27	46-50	656	572	802	975	717	485	459
28	51-55	812	630	950	1700	836	539	616
29	56-60	921	750	1500	-	392	632	750
30	over 60	1153	800	1750	-	512	800	-

