

# INDIAN STATISTICAL INSTITUTE

## ANNUAL REPORT

April 1957—March 1958

# INDIAN STATISTICAL INSTITUTE

## ANNUAL REPORT

April 1957—March 1958

### CONTENTS

	PAGE
CONSTITUTION AND ACTIVITIES .. .. .	1
APPENDICES	
1. Twentysixth Anniversary Celebrations .. .. .	6
2. Visiting Scientists .. .. .	12
3. External Activities .. .. .	14
4. Summary of Research Work .. .. .	16
4.1. Theoretical Statistics .. .. .	16
4.2. Biometry and Psychometry .. .. .	17
4.3. Economic Planning .. .. .	18
4.4. Electronics .. .. .	19
5. List of Papers .. .. .	20
5.1. Published Papers .. .. .	20
5.2. Papers Completed for Publication .. .. .	23
5.3. Papers Read at Conferences .. .. .	24
5.4. Working Papers and Notes .. .. .	25
6. List of Manpower Studies .. .. .	27
7. Library .. .. .	28
8. Mechanical Tabulation Equipment at Different Centres .. .. .	29
9. List of Trainees in Different Courses .. .. .	30
10. List of Successful Candidates in Professional Examinations .. .. .	35
11. Administrative Authorities .. .. .	39
12. Statement of Accounts .. .. .	42
13. Brief History .. .. .	46

# INDIAN STATISTICAL INSTITUTE

## Twentysixth Annual Report

April 1957—March 1958

### CONSTITUTION AND ACTIVITIES

#### INTRODUCTION

The Indian Statistical Institute completed the twenty-sixth year of its existence on 17 December 1957. Though work on statistics on scientific lines had started much earlier under the guidance of Professor Mahalanobis in what was known as the Statistical Laboratory, the Institute as such was brought into existence by a resolution passed at a public meeting held on 17 December 1931 under the Chairmanship of the late Sir R. N. Mookerjee who was elected the first President of the Institute and held that office for 5 years (1931–36). The Institute was registered as a non-profit learned society under Act XXI of 1860 in April 1932. Starting with a single part-time computer and a total current expenditure of Rs. 238 in the first year, the Institute has passed through alternating stages of acute financial difficulty and relative prosperity in reaching its present dimensions with a staff of about 2000 paid workers and an annual expenditure budget of over Rs. 84 lakhs.

The expansion of the Institute's activities both in volume and range since its foundation is described in brief outline in Appendix 13. But mention may be made here of three stages, broadly speaking, in its development, bearing in mind that there has always been considerable overlapping in the process so that no date-line can be fixed for the passage from one stage to another. During the first few years of its existence, the Institute served more or less as a laboratory for analytical studies including the design of experiments. Even during this early formative period, the Institute was commissioned by the Government as well as some private concerns to carry out several economic enquiries on a small scale.

The Institute passed on to the second stage with an increase in the number and scope of such enquiries, the most important among them being crop estimation surveys conducted on behalf of the Government of Bengal and other provincial Governments which led to the development of specialized techniques necessary for large-scale sample surveys.

The third and present stage followed as a logical consequence to the second when the Institute was called upon by the Government of India in 1950 to take a leading part in organizing the National Sample Survey and also to help with the work of planning for national development which it has been doing since 1954. The activities of the Institute have as a result become countrywide.

Through all these years, the Institute has continued to function as a research organization and a learned society. Indeed, with *Sankhyā : The Indian Journal of*

## INDIAN STATISTICAL INSTITUTE

*Statistics* as its official organ, research work has been given primary importance throughout. The Institute has society-type branches at Aligarh, Bangalore, Bombay, Madras and Poona. In Calcutta, besides the headquarters office at Baranagar, the Institute maintains three operating offices within the city, and also one each at Bombay, Bangalore, Delhi and Giridih (Bihar).

The Institute celebrated its twentysixth anniversary on 19 December 1957. A brief account of the celebration is given in Appendix 1.

*Constitution* : The supreme control of the Institute is vested in the general body of members of the Institute, which includes ordinary, life and honorary members, honorary fellows and patrons. It is this body which has the authority to make and amend the rules of the Institute. The Annual Report and Audited Accounts are presented at the Annual General Meeting; other General Meetings are held whenever necessary.

*Management* : The management of the Institute is vested in the President, who is the head of the Institute, Vice-Presidents and a Council consisting of the Chairman, Vice-Chairmen, Treasurer, Secretary and other office-bearers, and 20 members, elected by the members of the Institute, besides ex-officio representatives of regional branches and co-opted members. Subject to overall coordination by the Council, the management of the Research and Training School is vested in a Governing Body constituted with elected representatives of the Council of the Institute, of the Government of India, and of a number of public bodies. The International Statistical Education Centre is administered by a Board of Directors consisting of representatives of the International Statistical Education Centre, the Government of India and the Indian Statistical Institute. There are two Finance Committees, one of the Governing Body and the other of the Council, an *ad hoc* committee for allocation of expenditure, on which the Government of India is represented, a Journal Committee and an Examinations Committee; and several other committees, executive and technical, for day-to-day administration and co-ordination.

*Audit* : The Institute has an internal auditor, while a firm of chartered accountants qualified to audit accounts under the Indian Companies Act is appointed by the General Body of members at the Annual General Meeting as external auditors.

### ACTIVITIES

The Institute's activities can be broadly grouped into the following sectors.

*Research and Training School (RTS)* : The Institute maintains a Research and Training School which offers two-year post-M.Sc. training in professional statistics and several courses in theoretical and applied statistics in Calcutta and in Delhi in co-operation with the Central Statistical Organization. It also provides facilities to individual scientists for advance study and research. The RTS has well-equipped departments of theoretical and applied statistics, mathematics, biometry, biology, psychometry, anthropometry and geology, besides a unit for regional geographical surveys. The School also organizes the training of statistical computers at different levels and conducts several other special courses of training in collaboration with the Central Statistical Organization of the Government of India.

## TWENTYSIXTH ANNUAL REPORT : 1957-58

During the twenty-six years, 1932-1958, over 2,200 persons have received training in both theoretical and applied statistics in the Institute.

*General Activities* : Since its very inception, the Institute has maintained close contact with scientists in India and abroad as well as scientific institutions all over the world through branches in different parts of India, by participating in international conferences, inviting distinguished scientists to the Institute and through lectures and seminars and through the medium of *Sankhyā : The Indian Journal of Statistics*.

*International Statistical Education Centre* : The International Statistical Education Centre was opened in 1950 under the joint auspices of the UNESCO and the Government of India. The main purpose of the Centre is to provide courses in theoretical and applied statistics at various levels to selected participants from the countries of South and South-East Asia, the Far East and the Middle East. The teaching at the Centre is undertaken by members of the staff of the Indian Statistical Institute and visiting teachers provided by the International Statistical Institute and the United Nations. Up to the end of March 1958, eleven terms of training were completed during which 248 students from the following countries received training : Afghanistan, Burma, Cambodia, Ceylon, India, Indonesia, Iran, Iraq, Japan, Malaya, Nepal, Pakistan, Philippines, Singapore, Syria, Thailand and Viet-Nam. The twelfth term of the Centre started at the end of July 1958.

*Examinations* : The Institute has been holding all-India examinations at a number of centres in India for the award of the Statistician's Diploma and Computer's Certificate since 1938 and Certificate of Proficiency in Field-surveys since 1950.

*Projects* : The Institute has for many years been carrying out sample surveys, both small and large-scale, for the collection of information on agricultural crops and social and economic conditions of the people on behalf of different Governments and other bodies with the help of block grants sanctioned by the sponsoring authorities. It has also been functioning as a computational laboratory for scientific processing and analysis of statistical data for various authorities. Since 1950, the Institute has been handling, on a continuing basis, the vast project of the design and technical work and a part of the field work of the Indian National Sample Survey which is financed by the Government of India. A very large portion of the Institute's staff is at present engaged in this project which has for its objective the collection of comprehensive information relating to the social, economic and demographic characteristics of the country. The survey is carried out in rounds, each round of field investigation extending over periods varying from 4 to 12 months. The method used is that of canvassing suitable questionnaires in sample households, by trained field investigators. The number of households covered by the NSS every year is about 60,000; these are selected from both urban and rural areas all over the country. Information is also collected in respect of several organized industries. The results are made available to Government for use in connexion with the planning of the country's economy and for policy decisions. Reports and technical papers are also published for the information of the public. Twelve rounds of survey were completed by September 1957 and the field work for the 13th round was in progress when the year under review ended.

*Electronics Laboratory* : The Institute has an Electronics Computation Laboratory, which maintains an electronic digital computer, known as HEC 2M, and renders computation service to different departments of the Institute as well as other scientific institutions in

## INDIAN STATISTICAL INSTITUTE

India. A more advanced type of electronic computer, the URAL, received from the USSR, is being installed. The Laboratory is also engaged, in collaboration with the Workshop of the Institute, in developing devices and equipment for electronic computers.

*Development Workshop* : The Institute has a well-equipped Workshop which, in addition to the maintenance and servicing of calculating machines and other instruments and equipment of the Institute, assists the Electronics Laboratory in the maintenance and development of electronic computers. The Workshop is also carrying out development work for the manufacture of desk calculating machines and scientific instruments and has already produced a few sample desk calculators and punched card sorters besides some improved parts of calculating equipment. It has recently received many items of precision tools and equipment from the USSR through the United Nations.

*Machine Tabulation Service* : The Machine Tabulation Section of the Institute is perhaps the largest in Asia. On an average, over 3,00,000 cards are punched and fed into the machines every month. The following figures of average monthly card passages on some of the routine-types of machines give an idea of the volume of work transacted in the Section : Sorters 1,06,00,000 ; Tabulators 9,39,000 ; Multipliers 1,90,000 ; Collators 6,07,000.

*Statistical Quality Control (SQC)* : The Institute maintains five Statistical Quality Control Units, one each at Bangalore, Bombay, Calcutta, Coimbatore and Delhi, to provide service to industrial concerns, to organize training in SQC methods and to promote the use of SQC generally. General guidance is given by a Policy Advisory Committee set up by the Government of India.

*Operational Research Relating to Planning* : The Institute is engaged in operational research relating to planning for national development since 1954 when studies in this connexion were inaugurated by the Prime Minister, Sri Jawaharlal Nehru. The first phase of the work contributed to the preparation, by Professor Mahalanobis, of the "Draft Plan Frame", which was submitted to the Government in 1955 and was accepted as the basis for the formulation of the Second Five-Year Plan. Since then, one unit has been engaged in economic analysis and studies relating to planning, while another unit posted in Delhi is working on problems of scientific and technical manpower and perspective planning in collaboration with the Planning Commission, the Central Statistical Organization and appropriate Ministries of the Government of India. An experimental unit for the study of the economics of cottage industries, called *Kalyanasri*, was started in Calcutta in 1956.

*Sociological Studies* : Studies of a sociological nature are being carried on with special reference to the village as a social unit in terms of changes taking place in India in recent years.

*The Industrial Management Research Unit for Planning (IMRUP)* : This Unit was started in 1956 with its headquarters at Bangalore for research and studies in industrial management and has been carrying on studies for a number of organizations.

*Regional Planning* : Yet another unit was formed in 1956 with headquarters in Bangalore for research in regional planning with emphasis on geographical surveys.

*Research Library* : The Institute has a central library consisting of over 68,000 volumes and more than 1,200 journals and periodicals. There is a Translation Unit attached

to the Library which is engaged in translating documents of interests for purposes of planning from the Chinese, the Russian and other languages. There is also a well-equipped microfilming and photographic section.

*Tokyo Translation Unit* : The Institute has a unit in Tokyo for the translation of technical publications into English.

*General Services* : There is an Estate Department for the construction, repair and maintenance of the Institute's buildings, road, grounds, furniture and other equipment.

*Social and Welfare Services and Activities* : The Institute maintains hostels for students, a canteen for supplying subsidized refreshments, a mess for workers, a circulating library, medical units including a health home at Giridih, a night school, an adult literacy centre, an educational aid unit, and a workers' club for sports, recreation and cultural activities. There is also a workers' cooperative credit society. The Institute provides a good deal of "in-service" training. The Institute also publishes a house-journal, *Samvadadhvam*.

*Guest House* : The Institute maintains guest-apartments for visitors and guests coming to the Institute and a transport unit, the main function of which is to provide transport for the conveyance of workers between the Institute premises at Baranagar and the city.

*Associate Organizations* : In addition to the work done under the direct control of the Institute, the following associated organizations, located within or near the Institute premises, work in close cooperation with it.

The Statistical Publishing Society was established in 1935, on the initiative of the Institute, as a non-profit association, and registered under Act XXI of 1860, mainly for the publication of *Sankhyā : The Indian Journal of Statistics*, which is the official organ of the Indian Statistical Institute. The Society maintains the Eka Press which is adequately equipped for undertaking the printing of scientific and technical work.

The Indian Calculating Machine and Scientific Instruments Research Society was established in 1943, on the initiative of the Institute, as a non-profit society registered under Act XXI of 1860 with the object of promoting research, production and use in India of calculating machines and statistical, mathematical, scientific and engineering instruments, apparatus and appliances. This Society is now working in association with the Institute Workshop.

*Lands, Buildings, etc.* : The main offices of the Institute are at present located on the Institute's own land covering 4.78 acres at 203 Barrackpore Trunk Road. There is a seven-storeyed building with a floor space of over 64,000 sq. ft. besides more than 21,000 sq. ft. of space in sheds. In addition, about 60,000 sq. ft. of floor-space are occupied by the Institute at 202 Barrackpore Trunk Road which has been acquired and placed at the disposal of the Institute by the Government of India. The Institute also uses about 50,000 sq. ft. of space in rented premises in Baranagar and Calcutta. The Institute has about 35 acres of land with an experimental farm and a working branch with a staff of about 130 persons at Giridih.

A short history of the Institute and general information of the work done during the year are given in the appendices.

# INDIAN STATISTICAL INSTITUTE

## Appendix 1

### TWENTY-SIXTH ANNIVERSARY CELEBRATIONS

1. The twenty-sixth anniversary of the Indian Statistical Institute was celebrated on 19 December 1957. Workers of the Institute together with their families and friends participated in the function. Professor Satyendranath Bose, Vice-President of the Institute, presided.

2. The following were some of the foreign scientists working in the Institute who were present on the occasion : Dr. J. Rudolph, Director, Institute for National Planning, German Democratic Republic; Dr. Ellis R. Ott, Professor of Mathematical Statistics and SQC from U.S.A.; Dr. (Mrs.) Branka Vidas-Pihler from Yugoslavia; Mr. A. F. Zelinovsky, Deputy Chairman, USSR State Planning Commission; and Mr. D. J. Desmond, SQC expert from the UK. Students of the International Statistical Education Centre from the following countries also attended : Burma, Ceylon, Egypt, Japan, Philippines, Singapore and Thailand.

3. Some of the Institute departments were specially kept open for visitors till late hours on the anniversary day. Programmes of entertainment in the evening included a musical programme and showing of the film "Aparajita" directed by Sri Satyajit Roy.

#### PRESIDENT'S MESSAGE

4. In a letter to the Director, the President of the Institute Sri C. D. Deshmukh said :

I am sorry that I shall not be with you all on December 19th, the Anniversary Day of the Institute. If all goes well, by that time there should be clear indication of the recognition of the national importance of the Institute and of appropriate financial support and encouragement. To you personally this must be a source of quiet satisfaction, as it is to me who have had the privilege of giving some little help to you to build up the Institute. To the workers of all ranks without whose unstinted collaboration this stage could not have been reached, our grateful thanks are due.

Srimati Nirmal Kumari Mahalanobis has 'mothered' the Institute all these years, especially since its transfer to the present location, and to her on behalf of the Institute I tender our grateful thanks.

#### INAUGURAL SPEECH BY PROFESSOR P. C. MAHALANOBIS

5. Speaking on the provisions of the Draft Bill which was to be introduced in the Lok Sabha and the Institute's future relations with Government, Professor Mahalanobis said :

I should like very briefly to explain the position regarding the future status of the Institute to which our President has referred in his letter. Four or five years ago, the Government of India raised the question of having a Central University Act for the Institute. We have all along left it entirely to Government to decide the matter, that is, the Institute has neither asked for nor opposed a Central Act\*. It is not for the Institute

---

\* This proposal was later changed to having a Central Act to give recognition to the Institute as "an institution of national importance". A Bill for this purpose was introduced in the Lok Sabha in December 1956, which, however, was allowed to lapse.

to the Lit claims. If the Institute has rendered any useful service, then the recognition planning from the country. microfilming

Tokyo expected that a Bill for the Indian Statistical Institute would be introduced technical pubpha in the near future. I am glad to mention that the Bill in its draft satisfactory from the point of view of the Institute. Very briefly, the Institute would retain its character and status of a non-profit society and work under its own constitution. The Bill would seek to recognise the Institute as an institution of national importance and empower the Institute to confer degrees.

*Autonomy in Internal Affairs :* Secondly , the Bill would empower Government to make suitable grants to the Institute from time to time. The Institute would retain its autonomy in internal affairs, subject to evaluation of fulfilment of the objects for which the grants are sanctioned. The Draft Bill has provided that the accounts of the Institute would continue to be audited, as at present, by chartered accountants who would be appointed by the Institute with the approval of the Government. The Institute on its part would agree that the fundamental constitution would not be changed without Government approval. The Government would also have the right of setting up from time to time review-committees to evaluate the work of the Institute and report to Government.

Finally, one somewhat new arrangement was proposed by us and has been accepted. If Government finds, on the report of a reviewing-committee, that the management of the Institute has exceeded or missused its powers, then Government would have the right to call for explanation; and if the explanation is not considered to be satisfactory, Government would have the power to take over management of any part of the Institute or the whole of it for a specified period. This provision does not exist in the case of Universities but is similar to Government's power of supercession in the case of municipalities and local bodies. Government would not be able simply to issue directives and ask the Institute to carry out what in the opinion of the Institute would not be advisable. It would be the responsibility of Government to step in and manage the affairs of the Institute more efficiently.

The Draft Bill is a short one of about eleven clauses. The Council of the Institute has agreed. A Special General Meeting of the Institute would be held on the 4 January 1958 to consider the Draft Bill. If the members agree, the way will be open for Government to introduce the Bill. This is the matter to which the President has referred in his letter.

*Guests from Abroad :* I shall now, as is our custom, present before the meeting, our guests and friends from abroad. In this Institute we are extremely proud of the fact that we have many foreign guests every year. I shall now present them.

(Professor Mahalanobis then introduced the following visiting professors from abroad : Dr. Johannes Rudolph (East Germany), Mr. Teru Sasaki (Japan), Mr. J. Sandee (Netherlands), Professor J. B. S. Haldane (U.K.), and Dr. (Miss) Pamela Robinson (U.K.). Students of the International Statistical Education Centre from different Asian countries mentioned earlier were also introduced by Professor Mahalanobis.)

# INDIAN STATISTICAL INSTITUTE

## SPEECHES BY FOREIGN GUESTS

6. Dr. Ellis R. Ott, SQC expert from the UN, congratulated the staff and the Director for the many fine things they had accomplished in the Institute. Mr. Ott expressed the view that for the achievement of her present important tasks, India did not need "yes-men" but men of integrity and honesty, both spiritually, morally and culturally. Both he and Mrs. Ott had the privilege of being intimately associated, during their two visits, with such men and it was for this reason that they looked forward to increased progress in India.

7. Mr. A. F. Zelinovksy, Deputy Chairman, USSR State Planning Commission, conveyed the cordial greetings of the Central Statistical Board, and Central Planning Commission, USSR. He said that the statisticians and planners of his country were familiar with the work being done in the Institute which was also well-known for its role in strengthening the friendly ties between the Soviet Union and India.

8. The other guests who conveyed greetings in short speeches were Mr. Jan Sandee, formerly of the Central Planning Bureau, Netherlands; Dr. Helen Spurway (Mrs. Haldane) and Mr. Henry Smith, Professor from Cambridge.

## SPEECH BY PROFESSOR J. B. S. HALDANE

9. Professor J. B. S. Haldane, who spoke after the presentation of the foreign guests, said in the course of his speech :

I hate to strike a discordant note but I think it should be pointed out that properly speaking the history of this Institute goes back not only to 1931 but for more than 2,000 years. Asoka appointed an official called the *Dharmamahamatra* (excuse my Sanskrit). This, as I understand it, means the great measurer of duty or performance, who had to report to him every five years, and on whose reports the policy of the Government was to some extent based. Now I have not yet read the original documents but I hope to do so when I know a little Sanskrit, so I cannot say more. But I hope that if there is any opposition to the Bill which Professor Mahalanobis mentioned from traditionalist elements, in the Lok Sabha or the Rajya Sabha, they will realise that the idea of using accurate counting and measuring to frame State policy is not a new-fangled Western importation into India. It is much more probable, so far as I can judge that it originated in India, and it certainly goes back for a long way in India's past.

*Statistics and "Dharma"* : The second point is perhaps more important. We do not always realise that measurement and counting, which are the essentials, in my opinion, of statistics have a bearing on our duty, or whatever word you may choose to translate the very wide word "Dharma". This is a harder idea to grasp, but I believe that it is so important that some statistics should be a part of even the most elementary education. Why is it important? Let me take an example which is unfortunately topical. As you know, this year the rice crop has been a complete or partial failure in several areas of this country including some parts of West Bengal. Now, if official statistics are sufficiently badly wrong in one direction, some people may die of hunger next year. If they are too far wrong in the other direction, money will be spent on importing food which might have been spent on buying from abroad machinery, books, drugs and other essentials. So far no doubt the responsibility rests on the Government and its advisers. But not all the responsibility rests with the Government.

We can all cut down the food which we eat a little, and particularly perhaps, as the Government has suggested, our consumption of rice. Perhaps even more important, we can stop wasting food. Every scrap of food left on a plate or thrown away because more food was cooked than is needed, may help to kill a man, woman, or child in the course of next year. We in England learned this during the last war. There was very heavy propaganda against wasting food and the vast majority of us took it seriously....

*Importance of Counting and Measuring* : I do not know quite why Professor Mahalanobis gave me and my wife jobs here. But perhaps it was because we had counted and measured, generally in a rather crude manner, certain things which had not been counted or measured before, always in connexion with living beings. It will be our job to try to spread this habit of counting and measuring living beings. Unfortunately, I am desperately ignorant of what has been done in India. Here is a question I would like to ask you. I don't say, shout out the answer but let me know the if any of you know it. Do any of you know of any good figures on the yield of coconuts in different years from a number of individual coconut trees growing in the same area? Can one, that is to say, predict the yield of a tree next year from its yield this year? And how big are the differences, or if you like what is the variance in the yield of coconut palms? Now that is a very important question for States like West Bengal where the coconut is an important crop And I am ashamed to say I don't know if the figures exist. Before any reasoned programme to improve the breed of these trees is undertaken, we shall need figures of that kind on a pretty large scale. So I am merely, as I have said, revealing my ignorance for which I apologise....

*Some Statistical Questions* : But I am going to suggest another statistical question. And you will see in it the kind of way in which my mind is running. If a man wears black or dark brown clothes when the sun is shining brightly, he gets appreciably hotter than if he wears white or pale yellow clothes. Now, I think, we ought to find an answer to this question. Does a white bullock pulling a cart in sunshine get appreciably less hot than a dark coloured bullock by his side pulling the same cart? Perhaps that experiment has already been done at Izzatnagar or somewhere else. If not, it ought to be done. But it is a matter for statistical investigation. I don't think the difference would be very great. But if there were a favourable difference we would say that the gene for white was advantageous, at least where bullocks are used for pulling carts or ploughs. That is the kind of way my curiosity works, and the kind of really rather simple statistical questions which I am going to try to persuade someone to answer. They may be more important for India than some more high-brow, if I may say so, investigations which are also no doubt valuable.

*Research on Silk Moths* : Similarly my wife is trying to breed *tasar* silk moths. Of course, she is concerned with the colour, weight and quality of the silk. But she is also interested in the colour of the moths, which is, as far as we know, of no economic importance, and in how long the moths live after coming out of the cocoons. We have got the beginnings of a life table....

I would like everyone working in this Institute to get the habit of classifying and counting. Considered as a game it is quite good fun. Galton, who was one of the founders of statistics, used to play this game. In his remarkable book, "Enquiries into Human Faculty", which every statistician should read, he tells us how he used to take

## INDIAN STATISTICAL INSTITUTE

a little slip of paper with three divisions on it and prick holes in it with a pin. And he did this because he did not want to take notes, and he did not want to take notes because sometimes they might have been rather embarrassing. For example, as he walked down the street he would prick holes in three different parts of the paper according as the last woman he had seen was classified by him as attractive, neutral or repulsive. And I may add, it was no reason why a woman should not do the same; if she is doing something with the pin it may attract even less attention than if a man is doing it. But I would say that in fact such a record tells you a good deal more about yourself than about others. But it may nevertheless be worth doing....

Now Professor Mahalanobis in his speech said that in including Palaeontology here he has taken a rather liberal view of statistics....

It seems to me that starting Palaeontological work here needs no justification whatever, even though in the first few years it may not be possible to obtain data on a sufficient scale to do any statistics. I am sorry I am frightening these young ladies away. I will stop in a moment or two. I want to say that that is not all. If I were imprisoned for life in this compound, I should find enough to keep me busy, although I should be an abominable nuisance to our librarian and still a greater nuisance to the *malis*. I would start systematically counting and measuring leaves and flowers on the various plants in this garden as is already being done in this Institute. I would also try to estimate the abundance in various years of the caterpillars and other noxious insects which damage some of the plants, to see whether there is a periodicity in this and whether we can explain it. And during the nesting season, I should watch one single nest throughout the hours of daylight, recording the times during which the mother was present and absent from the nest from the time of the laying of the first egg to the departure of the last nestling. This has been done elsewhere and has given results of great interest.

But now I want to come back to my first point. If you are employed by the Indian Statistical Institute, you may regard it merely as a source of income. If you are not employed, you may regard it merely as a place where you get a free *tamasha* of some kind. But I personally regard it as one of the glories of India and even one of the glories of our planet. Whether it can be regarded as a glory of our solar system I do not know because I do not know enough about the cultural conditions of *Mangal* or *Brihaspati*—but I think it is quite probable that it can be so regarded. It is certainly an institution which is benefiting not only Indians but the whole of mankind. It is only because I believe that, that I have come here. Some of you, I know, feel the same way as I do about this Institute. And if so, I wanted to suggest that it is your duty to begin thinking statistically about a few more things. Because by thinking statistically about anything you can help your country and the world. If you get the habit, for example, of thinking statistically about how long your razor blades or your sarees last, you may help to spread the habit and thus among other things help to save the lives of some of your countrymen.

### CONCLUDING REMARKS BY PROFESSOR P. C. MAHALANOBIS

10. In his concluding remarks made after the others had spoken, Professor Mahalanobis said :

Friends, the Year's Review has been circulated in print, and you have seen it. With the Chairman's permission I shall only make a few brief observations.

I should just like to speak on just two points—the same two points on which I have spoken practically every year on this and on similar occasions.

*Unity of Purpose* : Looking back we continually find that there is some unity in the Institute although from the outside its activities appear to be rather varied. Just now Professor Haldane has given us strong support, for example, in having extended our interest to certain Palaeontological studies.

This unity stems on one side, I think, from the fact that the logic of statistics is in essence the method of scientific inference. Science is based on observations and measurements. There is, first, the accumulation of observations by description, counting or measurement; and secondly drawing inference from such observations which has its foundation in the logic of statistics. I think it is this logic which is at the back of the unity in the activities of the Institute.

But all this is abstract. In reality, I think, the unity stems from the fact that in this Institute our position has always been that whatever problems the workers of the Institute can study with profit, it is proper for the Institute to take up.

It is just as simple as that. If we have the men to take up any kind of study or any kind of activity, then it is proper, and I should go farther, then it is our responsibility to take up such work. This, I think, explains how the activities of the Institute have expanded, and now covers many different fields.

It was in the same way that the Institute started work on planning. It had become necessary that studies on planning should be taken up. We found that some of our workers including myself were interested in the subject. Therefore, we thought it proper that we should try our hand in thinking out what should be the lines of economic development in India.

*Workers' Co-operation* : This is the one point which I have been stressing almost every year. It is our workers, it is the men and women who are in the Institute—what they can do is the proper work of the Institute. I realize more and more as I grow older that the Institute has been strong when the workers did their work as a team with a cooperative spirit. The Institute has been weak when the workers were divided among themselves.

The Institute has been growing rather rapidly. I think perhaps much too rapidly. I am becoming more and more aware of the dangers which lie ahead—dangers, not of external opposition. On the contrary, in the history of the Institute we have always found that when the workers were united, external opposition was perhaps the greatest stimulus, the greatest challenge to progress. Therefore, it is not opposition from the outside of which I am afraid. But it is lack of unity of purpose within. As an organization grows big, there is continually that internal danger.

*Internal Strength* : Today, it is possible that the Central Government would introduce a Bill for the Institute. I can very honestly say that in one sense I am somewhat indifferent. An Institute Act would be, of course, of help. But even when there has been no Act we have survived and we have grown. Therefore, a Bill, whether it is introduced or not, or whether it is passed or not, is not after all the most important matter. The really important thing is the internal strength of the Institute; and that inheres in the unity of purpose of our workers.

## INDIAN STATISTICAL INSTITUTE

Recently, I had occasion to speak rather sharply to some of my young colleagues because I found there was a tendency to think in terms of departments, or even of 'we' and 'they'. This is the greatest danger. I have spoken sharply to remind my young colleagues that the Institute can thrive, can endure, can grow, and can grow from strength to strength only to the extent that we are united in our work.

This is what we accepted in the name of our house-journal *Samvadadhvam* : 'United we speak'. This is why our opening vedic hymn speaks of unity of purpose. More and more, and especially today when there is a possibility, a greater possibility than before, of an external transformation in the form of a Central Act for the Institute, I wish to appeal to all my fellow workers to become more and more strong in our unity of purpose.

We also thank all our friends. We have got help and support from outside. Opposition from outside is a challenge; and, at the same time, friendly interest from outside is a very great stimulus. That also we need and we thank all our guests and friends for having come here today. We shall continue to rely on their support."

### CONCLUDING SPEECH BY PROFESSOR S. N. BOSE

11. Professor Satyendranath Bose, a Vice-President of the Institute hoped that financial assistance from the Centre would enable the Institute to pursue the work it wanted to do. He said they were being told that Planning would transform the country beyond recognition. But the Institute should not stop at Planning alone. He would like it to make a "running audit" of how far the plan was being successfully implemented and how the planners had achieved success. Otherwise, he feared, plans might remain just "literary creations".

### Appendix 2

#### VISITING SCIENTISTS

As in previous years, the Institute was fortunate in having a number of distinguished scientists from various countries as visitors. Some of them came as visiting professors to work in the Institute for several months, while others came for shorter periods and participated in lectures or seminar activities.

A list of the names of the visiting scientists who stayed for a relatively long period is given below.

(1) Dr. J. Rudolph, Director, Institute for Economic Planning and Professor for Economic planning at Hochschule für Okonomic, German Democratic Republic (October 1957 to March 1958).

(2) Mr. J. Sandee, Chief, Long Term Problems Division, Central Planning Board, Holland, UNTAA Expert for ISI. (Arrived in November 1957 and still staying).

(3) Dr. A. I. Ezhov, Deputy Chief, Central Statistical Board, USSR (November 1957 to March 1958).

(4) Dr. A. F. Zelinovsky, Deputy Chairman, State Planning Commission, USSR (November to December 1957).

TWENTYSIXTH ANNUAL REPORT : 1957-58

(5) Mr. L. I. Lukin, Senior Economist, Central Statistical Board, USSR (November 1957 to March 1958).

(6) Mr. H. Smith, Vice-Principal, Ruskin College, Oxford (December 1957 to May 1958).

(7) Mr. A. Orthaber, Professor, University of Ljubljana, Yugoslavia (January to March 1958).

(8) Dr. (Miss) Pamela L. Robinson, Department of Zoology, University College, London (October 1957 to April 1958).

*Foreign Lecturers :* The following scientists, who came to the Institute on brief visits, gave lectures and took part in discussions in the Institute.

(1) Dr. Nathan Keyfitz, Dominion Bureau of Statistics of Canada and Director, Office of Technical Co-operation in South and South East Asia, Colombo. Lecture : Some Aspects of Sampling (July 1957).

(2) Dr. Raymond B. Cattell, Research Professor of Psychology, University of Illinois, U.S.A. Lecture : Recent Trends in Personality and Motivation Measurements (August 1957).

(3) Dr. Leon H. Keyserling, Adviser to the Senate, USA, formerly Chairman, Council of Economic Advisers to the President, USA. A course of three lectures on Observations on the Indian and United States Economies (October 1957).

(4) Mr. Shohai Kawakatsu, Department of Agricultural Economics, Michigan State University, U.S.A. A course of three lectures on (i) An Economist's View of Crop Response Analysis, (ii) A Response Model with the Different Initial Nutrient Levels and (iii) a Handy Method in Estimating the Constant Marginal Rate of Substitution between fertilizer and residual soil nutrient (November 1957).

(5) Dr. H. El Badry, Professor of Statistics, Cairo University and Institute of Statistics. A course of two lectures on (i) Repeated Mail Surveys and (ii) Some Aspects of the Demography of Egypt (November 1957).

(6) Dr. J. Lederberg, University of Wisconsin, USA. Lecture on the Mechanism of Genetical Recombination (November 1957).

(7) Dr. D. A. Mitchison, World Health Organization. Discussion on Controlled Trials on Therapeutic Agents (November 1957):

(8) Professor Dr. Jerzy Litwiniszin, Correspondent Member of Polish Academy of Sciences and Professor at Mining Academy in Cracow. Lecture : The Application of Stochastic Methods to the Mechanics of Granular Media (January 1958).

(9) Professor S. M. Nicholsky, Deputy Director, Mathematical Institute, USSR. Lecture : Imbedding Theorems for Differentiable Functions of Several Variables (January 1958).

(10) Mr. David Owen, UN Technical Assistance Board. Lecture : United Nations Assistance in Economic Development (February 1958).

(11) Mr. C. K. Dilwali, United Nations Statistical Officer. A course of two lectures on Data Processing Methods (February 1958).

(12) Professor Wassily Leontief, Harvard University. Lecture : Changing Role of Economics (February 1958).

## INDIAN STATISTICAL INSTITUTE

(13) Professor E. S. Kirby, University of Hong Kong. Lecture : Economic Policy and Planning in China (February 1958).

(14) Professor P. M. S. Blackett, F.R.S., N. L., Imperial College of Science and Technology. A course of two lectures on (i) Controlled Fusion Reactions, (ii) Some Historical Aspects of the Rise of Modern Technology (February 1958).

(15) Dr. F. Yates, Rothamsted Experimental Station. Discussion on Long-Range Planning for Agriculture.

(16) Mr. Alvin H. Hansen, Emeritus Professor of Political Economy, Harvard University, USA. Lecture : Problems of Economic Growth. (March 1958.)

(17) Dr. M. Atiqullah, Lecturer in Statistics, University of Dacca (East Pakistan). Lecture : On the Structure of Partially Balanced Incomplete Block Designs (August 1957).

(18) Professor R. M. Sandrum, University of Rangoon. Lecture : Some Problems of Statistical Research (August 1957).

(19) Mr. Mogens Boserup, Research Associate, 20th Century Fund, Asian Study. Seminar on Planning.

(20) Mr. Bimal Ghosh, International Labour Office, Geneva. Two lectures on Approach to Labour Problems in Under-Developed Economies and on ILO Activities (May 1957).

(21) Professor Q. M. Hussain, University of Dacca, Pakistan. Lecture : Bordering of Symmetric Designs (June 1957).

(22) Professor Charles Bettelheim, Professor of Economics, *Ecole Pratique des Hautes Etudes*, Sorbonne, France. Seminar : Rate of Accumulation and Rate of Growth (January 1958).

*Indian Lecturers :* The following lectures were delivered by Indian statisticians and economists :

(1) Sri B. P. Adhikari, University of Lucknow. Lecture : On Testing of Hypothesis for Stochastic Process (July 1957).

(2) Dr. K. S. Banerjee, Deputy Director, State Statistical Bureau, West Bengal. A course of six lectures on Construction of Index numbers (September 1957).

(3) Dr. Uttam Chand, Central Statistical Organization, New Delhi. A course of two lectures on Planning of Field Experiments (February 1958).

### Appendix 3

#### EXTERNAL ACTIVITIES

Professor P. C. Mahalanobis, Director, Indian Statistical Institute, paid two visits abroad during the year : the first to China in June-July 1957 and the second to Europe (Sweden, U. S. S. R., England and Switzerland) in August-September, 1957.

At the invitation of the Chinese Statistical Bureau and the People's University of China, Professor Mahalanobis, Mrs. Mahalanobis and Sri D. B. Lahiri, left India for China on 16 June 1957 and arrived in Peking on 21 June after staying two nights in Canton. In Peking, Professor Mahalanobis and Sri Lahiri participated in 8 group discussions on "Sample Surveys". Professor Mahalanobis also gave five lectures of which two were on

“Sample Surveys” at the National Statistical Bureau, one on “Recent Developments in the Theory and Applications of Mathematical Statistics” at the Peking University and the People’s University. Sri D. B. Lahiri gave four lectures on “Applications of the Theory of Mathematical Probability in Sample Surveys” of which two were given at the National Statistical Bureau, one at the People’s University, and one at the Academy of Sciences. Professor Mahalanobis, Mrs. Mahalanobis and Sri D. B. Lahiri left Peking on 10 July, reaching India on 14 July.

Professor Mahalanobis, accompanied by Mrs. Mahalanobis, again left India on 5 August 1957 to attend the 30th session of the International Statistical Institute held in Stockholm from the 8th to the 15th August 1957. Professor Mahalanobis presented a paper at the session on “Some Observations on the World Census of Agriculture” and presided over the meetings of the Education Committee of the International Statistical Institute. He also took part in several scientific discussions with foreign colleagues. From Stockholm, Professor and Mrs. Mahalanobis went to Moscow on 17 August 1957 at the invitation of the U. S. S. R. Academy of Sciences. He participated in several group discussions on statistical and planning problems at the Institute of Economics of the Academy of Sciences and the Central Statistical Board. Professor Mahalanobis held discussions on planning and technical co-operation between U. S. S. R. and India with Academician A. N. Nesmeyanov, President of the Academy of Sciences ; Mr. N. N. Kuzmin, Chairman of the Planning Commission ; Mr. M. C. Pervukhin, Chairman and Academician D. D. Degtyar, Member of the State Committee on External Economic Relations ; and Professor Starovsky, Chairman, Central Statistical Administration. The subject of these discussions was mostly the technical help received from the U. S. S. R. for work on statistics and planning that is being done in the Indian Statistical Institute.

Professor and Mrs. Mahalanobis left Moscow on 31 August 1957 for Oxford where Professor Mahalanobis attended as a guest the International Conference on Operations Research which was held there from 2 to 6 September 1957. Professor Mahalanobis spoke at one session on behalf of the Operational Research Society of India and also took part in discussions. After short halts in London and Geneva, they came back to India on 17 September 1957.

Dr. C. R. Rao presided over the section on Social Statistics and Demography of the Indian Sociological Conference, Agra, in February 1958. He also served on the Boards of Studies of several universities.

Sri Ajit Das Gupta attended the joint meeting of the International Statistical Institute and the International Union for the Scientific Studies of Population held in Stockholm in September 1957.

Sri M. Mukherjee was appointed a member of the Advisory Committee for National Income set up by the Government of India.

Sri Mohanlal Ganguly was invited to act as a member of the *ad hoc* Committee on Tea Cess by the Central Tea Board.

The following members of the RTS staff attended the 45th session of the Indian Science Congress held in January 1958 at Madras and presented papers and/or participated in the discussions : Professor P. C. Mahalanobis, Professor J. B. S. Haldane,

## INDIAN STATISTICAL INSTITUTE

Dr. C. R. Rao, Dr. Ramkrishna Mukherjee, Dr. Sujit Kumar Mitra, Sri I. M. Chakravarti, Mr. Ali Madani, Mr. K. R. Mazloun.

Sri V. S. Varadarajan and Sri R. Ranga Rao attended the 33rd All-India Mathematical Conference held in December 1957 at Cuttack and presented papers.

Sri N. K. Chatterjee attended the Indian Economic Conference and Indian Agricultural Conference held in Nagpur and participated in the discussions.

Sri M. Mukherjee, Sri V. Prakash and Sri S. M. Kansal presented papers at the First Conference on Research in National Income, held in the Indian Statistical Institute.

*Honours and Awards* : Professor P. C. Mahalanobis was elected Honorary President of the International Statistical Institute at its 30th session held in Stockholm in August 1957. He was elected President of the National Institute of Sciences of India for the year 1957. He was awarded the Sir Devaprasad Sarvadhikary Gold Medal for 1957 by the Calcutta University, the citation describing him as "one of the most famous scientists of the day".

Professor Mahalanobis was elected in 1958 a Foreign Member of the USSR Academy of Sciences as a recognition of his distinguished services in the sphere of statistics, mathematics and economics.

Dr. C. R. Rao was elected a Fellow of the Institute of Mathematical Statistics in the USA. in 1958. Sri M. Mukherjee was elected a member of the International Association for Research into Income and Wealth.

### Appendix 4

#### SUMMARY OF RESEARCH WORK\*

##### 4.1 THEORETICAL STATISTICS

1. *Probability Theory* (35, 36, 49, 50, 72, 73, 74, 75) : Spaces of probability measures on abstract spaces have been investigated with several topologies and the resulting configurations studied. In particular, problems of metrization, convergence, compactness and structure of these topologies were given solutions in their abstract setting. These results were applied to the purely topological problems of rings of continuous functions. Further, measures have been viewed as linear functionals on suitable spaces of continuous functions and the theorem of Riesz is shown to be a consequence of the well known theorem of Kolmogorov on mutually consistent probability distributions.

It is proved that if  $X_1, X_2 \dots$  are independent observations from a metric-space valued random variable, the sample probability distribution converges weakly to the population distribution almost surely.

A theorem of Yosida and Hewitt on the decomposition of a finitely additive measure is proved as an application of Zorn's Lemma.

Assuming the continuum hypothesis, it is shown that the Borel family of subsets of a metric space is separable if and only if the metric space is separable.

---

\* Numbers within brackets indicate serial number of the paper in Appendix 5.

2. *Characterization Theorem* (85) : If  $X_1, \dots, X_n$  are independently distributed with means as in the least squares set up and variances independent of the parameters, then under certain mild restrictions it is shown that the variables are normally distributed if and only if the least squares estimate is the uniformly minimum variance estimate in the class of all unbiased estimate.

3. *Estimation* : (1, 37, 68) : It is shown that in a given statistical framework, a necessary and sufficient condition that every estimable parameter admits a uniformly minimum variance estimator is that the given framework admits a complete sufficient statistics. A reformulation of the problem of maximum likelihood estimation is given in the light of which the case of the multinomial population is dealt with under the best possible conditions. The problem of maximum likelihood estimation is considered in the light of its reformulation when the population is the infinite multinomial. Theorems of consistency and asymptotic normality are proved under appropriate conditions.

4. *Decision Functions* (53) : Optimum properties of certain decision procedures are discussed when the problems considered are those of classification of populations according to their parameters. Bayes solutions are derived and minimax criteria and admissibility are discussed.

5. *Information Theory* (24) : Certain lower bounds for Hamming minimum distance binary codes are obtained in the special case of group codes.

6. *Design of Experiments* (8, 42) : Simplified proofs of certain results in the theory of optimal designs are presented. Designs have been obtained to describe response surfaces in the near-stationary region and to set confidence intervals for the optimum, unaffected by deviations in the assumed polynomial model.

7. *Sample Surveys* (34, 52) : Some results have been obtained in the theory of sampling with and without replacement. It has been shown that corresponding to any biased or unbiased ordered estimator there exists an unordered estimator which is more efficient. The technique of improving the ordered estimators have also been explained. This method is applied to the estimators of population total and unbiased variance estimators.

#### 4.2 BIOMETRY AND PSYCHOMETRY

1. *Blood Group and Clinical Investigations* : A survey of ABO, Rh, and MN blood groups in Institute workers was initiated. A limited number of workers also participated in a complete clinical survey, involving chemical analysis of blood and urine, and the electrophoretic pattern of hemoglobin and gamma globulin. In connection with the blood group survey, ABO and MN sera are being produced in the laboratory.

2. *Distribution of Flower Petals and Teeth* (44) : Petal counts of *Nyctanthes arbortrists* show that the mean does not alter greatly during a season, but the variance increases and may double. The number of teeth on the leaves of the same plant shows a bimodal distribution in some bushes, but not in others. The symmetry of leaves on two plant species has been examined, and a correlation of about .95 obtained.

3. *Genetic Studies of Tussore Silk Moths* : Tussore silk moths of the genus *Antheraea* cultivated in West Bengal and Bihar are being bred.

4. *Gonadic Rhythm of Viviparous Fish* (46) : The gonadic rhythm of the viviparous fish, *Lebistes reticulatus*, is being studied in stocks from Calcutta, London, Washington and Paris. The material includes hermaphroditic fish in whom self-fertilization occurs.

5. *Mixed Paddy and Fish Culture* (56) : Experimental plots (in Giridih) were allocated to treatments with paddy, with fish, and with both fish and paddy, using a randomized block design. The fish, species of Indian fresh water carp, were found to survive better in plots without paddy, while paddy yield was greater from plots with fish.

6. *Spawn Survival* (58, 59) : Survival rates of Indian fresh water carp, from 1st to 4th week of life, were determined under control and treated conditions. It was found that there is a short period of low survival early in spawn life, during which experimental treatments with vitamin B, B complex and antibiotics significantly enhance survival. Randomized block and factorial designs were adopted for different studies.

7. *Synthetic Plant Hormones* (57) : A Youden Square design was adopted to investigate the effects of three synthetic plant hormones on the cauliflower. Final flower weight was found to be significantly enhanced by several of the experimental treatments.

8. *Psychometric Analysis* (14, 110, 116, 129, 130) : Reliability of interviews was investigated empirically in several studies and estimated bias of intra-class correlations. Bias in interview judgements was analysed by an analysis of variance treating the data as a three-way factorial design without replication. Reliability of several psychometric tests was estimated by eight formulae. Estimates for all but one formula were found to fall within the 95% confidence interval for Kuder-Richardson formula (20). Item analysis indices of difficulty and discrimination were compared when the proportions were corrected by different chance correction formulae. Factory analyses were carried out on several test batteries.

9. *Test Development* (13, 97, 111, 116, 131) : Tests developed included a non-verbal interest inventory, a scale of study habits, an abstract reasoning test, and a differential aptitude test. A battery for card punch operators was validated. A mathematical aptitude test was standardized.

#### 4.3 ECONOMIC PLANNING

1. *Inter-industry Studies* (90, 93, 103, 132) : Transactions tables for 1951-52 and 1953-54 were put under the same industrial classification facilitating comparison of the two tables. Studies on the application of the transactions table and on the theoretical basis of the subject have been made. A new programme for the preparation of tables for 1954-55 and 1955-56 has been taken up.

2. *Consumer behaviour* (91, 126) : Unweighted estimates of Engel elasticities were calculated and incorporated in the Institute memorandum supplied to the Food-grains Enquiry Committee. A paper on the movement of consumer expenditure over the different NSS rounds was completed and the estimates were used to deflate a national income series by the final expenditure approach. The distribution of calorie consumption in individual households was studied on the basis of National Sample Survey data. Applicability of different functions to describe consumer behaviour was studied and an attempt was made to apply discrimination analysis on consumer expenditure data.

3. *Growth Models* (4, 127) : A monograph on the model used for long range planning in East Germany was prepared. A ten-year decision model for India using the method of linear programming was constructed and solved. An attempt was made to introduce money supply in the Mahalanobis 2 sector model under simplifying assumptions.

4. *Miscellaneous Research Work on Planning* (100, 101, 108, 109, 117, 123, 128) : Studies were made on planning in Yugoslavia on the teaching of statisticians and economists in the Soviet Unit, on technical man-power, on the import and export pattern in India on planning in China, and on transportation problems.

5. *National Income and Allied Topics* (83, 92, 98, 99, 105, 106, 118, 124, 125) : An estimate of tangible wealth in India was worked out. Studies were made on the contribution to national income by plantations on the stock of precious metals in India and on the deflation of final expenditures. Work continued on distribution of income by factor shares. The extent of wholesale and retail turnover in the country and the incomes generated in these activities were studied. A study was made of the role of public and private sectors in the Indian context.

6. *Miscellaneous Work* (17, 18, 86, 93, 107, 121, 122, 133) : The analysis of consumption data for the Institute workers was completed. A historical study of small industries in India was undertaken. Data supplied by the Cottage Industries Research Centre of the Institute were used to study the cost structure of handloom weaving industry. Statistical aspects of acceleration principle and supply function of Indian exports were studied. Some work on historical study on the movements in real wages and consumption over time was taken up in collaboration with the Asian Study Group led by G. Myrdal. Studies on industrial structure and labour productivity on the basis of Census of Manufactures data as well as commodity studies were continued.

#### 4.4 ELECTRONICS

1. *Computer 'Fast Multiply' Circuit* (39) : The new 'Fast Multiply' circuit first writes out the multiplicand in all locations of a chosen track and carries out the operations necessary for multiplication operation during subsequent drum revolutions by calling the multiplicand from every alternate word location of this track. Thus eight iterations are now available per drum revolution instead of the single iteration originally.

2. *Dual Delay A.T.D. System* : A new circuit has been designed which senses the occurrence of track change-over and provides automatically for the corrective delay time required. The circuit is known as 'Dual Delay A.T.D. System'. Inclusion of this circuit has greatly added to ease the programming of the computer.

3. *Drum Memory* (25, 62) : The newly constructed control apparatus for a serial drum memory, incorporates newly designed gates, triggers, switches, decoders and sequential circuit elements. It is suitable for use either as a complete memory device in a digital computer or for work on input/output devices and auxiliary memory units. Two kinds of modulator/switches were designed for performing record—reproduce functions on a magnetic drum memory.

4. *Track-Switching System* (60) : A track-switching system based on a combination of impedance transformation principles and magnetic amplifier properties has been built to replace the track-switching relays of HEC2M.

## INDIAN STATISTICAL INSTITUTE

5. *Magnetic Drum* : A magnetic drum that rotates at higher speeds for investigating properties of the coating materials and effects of speed of the drum was constructed in cooperation with the Development Workshop.

6. *Matrix Algebra and Linear Transformations (63)* : Some studies were conducted on matrix algebra and the results were found to be of immediate use for numerical computations performed on the HEC2M.

### PROBLEMS SOLVED ON THE HEC2M

sl. no.	Project Title	Sponsored by	Numerical Technique used
1.	Evaluation of the complete eigen-value spectra of real symmetrical matrices of orders 3, 4, 6, 7, 12, 16 and 22.	Department of Physics, Andhra University, Waltair.	Jacobi's Method; Invariance of the trace and norm under similar transformation.
2.	Computation of the eigen-vectors of a real symmetric matrix of order 6.	-do-	A finite iteration method based on the G Caley-Hamilton Theorem.
3.	Computation of the trajectory of a missile with tabulated air-resistance function.	Ministry of Defence, T.D.E., Kirkee.	Modified Runge-Kutta Method; Differencing check.
4.	Selection of random numbers for systematic sampling.	N.S.S. (Research) Department.	
5.	Scrutiny of primary statistical data and rejection of the doubtful by computing the standard deviation and mean.	N.S.S. (Operation) Department.	
6.	Preparation of correlation matrices of large orders.	Psychometry Unit : R.T.S.	
7.	Inversion of a matrix of order 34	Planning Division	Orthogonalisation of column vectors and iteration.
8.	Linear programming	Planning Division.	Simplex Method.
9.	Solution of a set of recursion relations	Jute Research Institute	

## Appendix 5

### LIST OF PAPERS

#### 5.1 PUBLISHED PAPERS

1. BAHADUR, R. R. (1957) : On unbiased estimates of uniformly minimum variance *Sankhyā*, **18**, 211.
2. BISWAS, A. : (1957). On a model of planned growth. *Arthaniti*, **1**, **40** and *Economic Weekly* **10**, 640 (1958).
3. ——— (1957) : Optimal technique in multi-sector economy. *The Economic Weekly*, **9**, 1055.

4. ——— (1958) : Demand for imports under planning : Some theoretical considerations. *Economic Weekly*, **10**, 640.
5. BISWAS, S. (1957) : On a method of evaluation of epidemic indices relating to cholera. *Indian Journal of Public Health*, **1**, 182.
6. BRAHMACHARY, RATANLAL : A generalisation of Reissner-Nordstrom solution II. *Nuovo Cimento* (Italy), **5**, 1520.
7. ——— : A class of exact solutions of combined gravitational and electromagnetic field equations of general relativity.
8. CHAKRAVARTI, INDRAMOHAN (1958) : Simplified proofs of some results in the theory of optimal designs. *Sankhyā*, **19**, 189.
9. CHANDRASEKHAR, N. (1957) : Plant Anticoagulants. *J. Sci. Ind. Res.* **16**, 106.
10. ——— (1957) : Agarelectrophoresis Pt. III. Animal haemoglobins. *J. Ind. Inst. Sci.* **16**, 106.
11. ——— (1957) : The effect of thyroid activity on the conversion of carotene and retinene to 'vitamin A' and on serum proteins. *J. Nutrition*, **63**, 571.
12. ——— (1958) : An electrophoretic study of elephant serum proteins. *Arch. Biochem. Biophys.* (U.S.A.) **73**, 320.
13. CHATTERJEE, S. (1957) : Standardisation of Iowa Math. Aptitude Test under Indian conditions. *Ind. J. Psychol.*, **32**, 217.
14. DAS, RHEA S. (1957) : Methodological analysis of interview data for personnel selection *Psychological Studies*, **2**, 1.
15. ——— (1957) : The role of psychology in Indian Industry. *Management Topics*, **2**, 17.
16. ——— (1957) : Methodological analysis of the concepts 'Personality' and 'Attitude'. *Indian Journal of Psychology*, **32**, 79.
17. DASGUPTA, SAMIR (1957) : Under-employment—Its conceptual and statistical issues. *Economic Weekly*, **9**, 1106.
18. ——— (1958) : Production and Circulation—Lags and Capital Co-efficient. *Economic Weekly*, **10**, 797.
19. HALDANE, J. B. S. (1956) : Methods for the detection and enumeration of mutations produced by irradiation in mice. *Proceedings, International Genetics Symposium*.
20. ——— (1957) : Karl Pearson. *Biometrika*, **44**, 303. Reprinted in *New Biology*, Jan. 1958.
21. ——— (1957) : The syādvāda system of predication. *Sankhyā*, **18**, 195.
22. ——— (1957) : Sex determination in Metazoa. *Proc. of Zool. Soc. Calcutta. Mukherjee Memorial Volume*. **4**, 13.
23. ——— (1957) : Parthenogenese—*Triangel*, **3**, December.
24. JAIN, SOHAN LAL (1957) : *Mizelleus indicus* n.g., n.sp. (sub-family Tetraonchinae), from the gill filaments of *Wallagonia attu* (Bloch), *Annals of Zoology*, **2**, 57.

INDIAN STATISTICAL INSTITUTE

25. ——— (1957) : Monogenea of Indian fresh-water fishes, V *Dactylogyrus multispiralis* n. sp. (sub-family *Dactylogyrinae*) from the gill filaments of *Silondia silondia* (Ham) from Lucknow, India. *Proceedings, National Academy of Sciences*, **26**, 26.
26. ——— (1957) : Monogenea of Indian fresh-water fishes, VI Three new trematodes belonging to the genus *Neodactylogyrus* Price, 1938 (Family *Dactylogyrinae*), from some fresh-water fishes of Lucknow, India. *Proceedings, National Academy of Sciences*, **28**, 53.
27. JOSHI, DEBIDUTT (1958) : On some upper bounds for minimum distance codes. *Information and Control* **1**, 289.
28. KAMAT, D. S. (1958) : Control Apparatus for a Serial Drum Memory. *Electronic Engineering*, London, **29**, 634.
29. LAHA, RADHAGOVINDA (1957) : On some characterisation problems connected with linear structural relations. *Ann. Math. Stat.* **28**, 405.
30. ——— (with ROY, J.) (1957) : On partially balanced linked block designs. *Ann. Math. Stat.* **28**, 488.
31. MAHALANOBIS, PRASANTA CHANDRA (1958) : Science and National Planning. President's Anniversary address, National Institute of Sciences of India.
32. ——— : (1957). (Editor) The University teaching of social sciences—Statistics, UNESCO.
33. MITRA, SHIB KUMAR (1958) : On examination reform. *Teachers Quarterly* (Institute of Education for Women, Calcutta), **3**, No. I.
34. MITRA, SUJIT KUMAR (with ROY, J.) (1957) : Unbiased minimum variance estimation in a class of discrete distribution. *Sankhyā*, **18**, 371.
35. MUKHERJEE, RAMKRISHNA : Dynamics of a Rural Society (1958) : A study of the economic structure in Bengal villages. *Akademic—Verlag, Berlin*.
36. ——— (1958) : Six villages of Bengal : A socio-economic survey. *Asiatic Society Calcutta*.
37. MURTHY, M. N. (1957) : Ordered and unordered estimators in sampling without replacement. *Sankhyā*, **18**, 379.
38. RANGO RAO, R. (1958) : A note on finitely additive measures. *Sankhyā*, **19**, 27.
39. RANGA RAO, R. and V. S. VARADARAJAN (1958) : A theorem in metric spaces. *Ann. Math. Stat.*, **19**, 612.
40. RAO, C. RADHA KRISHNA (1957) : Maximum likelihood estimation for the multinomial distribution. *Sankhyā*, **18**, 139.
41. ——— (1958) : Some statistical methods for comparison of growth curves. *Biometrics*, **14**, 1.
42. ROY, A. (1958) : The Electronic Digital Computer—HEC2M. *Journal of the Institute of Telecommunications Engineers*, **4**, 137.
43. RAY CHOWDHURY, TAPAN KUMAR (1957) : A research note on fossil spores and pollen from the Lower Gondwanas of the Raniganj Coalfields. *The Quarterly Journal of the Geological, Mining and Metallurgical Society of India*. **29**, 51.

TWENTYSIXTH ANNUAL REPORT : 1957-58

44. ROY, J. (1957) : A note on variance components in multistage-sampling with varying probabilities. *Sankhyā*, **17**, 367.
45. ——— (1958) : On the efficiency of block designs. *Sankhyā* **19**, 181.
46. ——— (1957) : (with LAHA, R. G.) : On partially balanced linked block designs. *Ann. Math. Stat.*, **28**, 488
47. ——— (1957) : (with MITRA, S. K.) : Unbiased minimum variance estimation in a class of discrete distributions. *Sankhyā*, **18**, 371.
48. ROY, S. K. (1957) : Studies on the activities of earthworms. *Proc. Zool. Soc. Calcutta*. 10, 81.
49. ——— (1958) : The regulation of petal number. *Current Science*, 27, 134.
50. SPURWAY, H. (1957) : Heterosis and the evolution of reproductive Isolation. *Proc. Zool. Soc. Calcutta*. Mukherjee Memorial Volume 4, 57.
51. ——— (1957) : Hermaphroditism with self-fertilization and the monthly extrusion of the unfertilised eggs in the viviparous fish, *Lebistes Reticulatus*. *Nature*, 180, 1248.
52. ——— (1957) : Studying the natural sciences in Europe. *Mankind*, 11, 311.
53. ——— (1956) : The relevance of Heterosis to reproductive isolation. *Proceedings of the International Genetics Symposia*, 390.
54. VARADARAJAN, V. S. (1958) : Weak convergence of measures in separable metric spaces. *Sankhyā*, **19**, 15.
55. ——— (1958) : On the convergence of sample probability distributions. *Sankhyā*, **19**, 23.
56. ——— and RANGA RAO, R. (1958) : A theorem in metric spaces. *Ann. of Math. Statistics*, **29**, 612.

5.2 PAPERS COMPLETED FOR PUBLICATION

57. BANERJI, R. B. : Methods of Measuring Ionospheric Winds by Fading at Spand Receivers. Submitted to the *Journal of Atmospheric and Terrestrial Physics*.
58. BASU, DEBABRATA : On sampling with and without replacement. Submitted to *Sankhyā*.
59. BHATTACHARYA, PRADYUT KUMAR : Optimum properties of some decision procedures. Thesis submitted to the Calcutta University for the D. Phil Degree.
60. BISWAS, S. : A note on a method of evaluating birth, and death rates from registration data. Sent for publication.
61. CHATTERJEE, S. : A method of developing stick-figure items for non-verbal tests. Submitted to the *Journal of Educational and Psychological Measurements*, U.S.A.
62. DAS, B. C. : An experimental investigation of the dual use of paddy fields : mixed rice cultivation and fish culture. Submitted to the *Indian Journal of Fisheries*.
63. ——— : Comparative effects of 3-Indolyl-butyric acid, 2-3-5 Tri-iodo-benzoic acid, and B-Naphthoxy-acetic acid on the time of flowering, flower diameter and flower weight of the cauliflower (*Brassica cleracea botrytis*). Submitted to *Canadian Journal of Botany*.

## INDIAN STATISTICAL INSTITUTE

64. ——— and KRISHNAMURTHY, H. : Survival rates of the Indian carp (*Catla catla*, *Labeo rohita*, *Cirrhina mrigala*) from 1st to 4th week of life under experimental treatments isolating vitamin B<sub>12</sub> from vitamin B Complex. Submitted to *Sankhya*.
65. ——— and KRISHNAMURTHY, H. : Survival rates of the Indian carp (*Catla catla*, *Labeo rohita*, *Cirrhina mrigala*) from 1st to 4th week of life under different experimental treatments. Submitted to *Sankhya*.
66. DATTA MAJUMDAR, D. : A Track Switching System for Magnetic Drum Memory. *Electronic Engineering*, London (In press).
67. HALDANE, J. B. S. and SPURWAY, H. : The regulation of air breathing in the *Koi*, *Anabus Testutineus*. *Proc. of the 45th session of the Indian Science Congress, Madras*, 1958.
68. KAMAT, D. S. : Two New Modulator—Switches for Computer Applications.
69. MITRA, S. K. : Note on the Convergence of Hotelling's Iteration Method of Solving Linear Equations and its Extension to the case of Solution of Normal Equations.
70. MITRA, S. K. & NAG, BISWARANJAN : The Design Principles of an Analog Computing Machine for Solving Linear Equations & Related Problems.
71. MITRA, SHIB K. : Projective Techniques. To be published in Telegu Encyclopaedia.
72. ——— : Rorschach Test. To be published in Telegu Encyclopaedia.
73. POTI, S. J., RAMAN, M. V., BISWAS, S. and CHAKRAVARTY, B. : A Pilot Health Survey in West Bengal, 1955. Submitted to *Sankhya*.
74. RAO, C. R. : Maximum likelihood estimation in the case of the infinite multinomial distribution with infinite number of cells. *Sankhyā* (in press).
75. SANGAL, S. P. (and RAMBO, U. C.) : Development of presbyopia at different ages with special reference to the people of India. Submitted to *Journal of the American Medical Association*.
76. SOM, R. K. : Sampling Design in opinion and market Research. To be published in *Public Opinion Quarterly*.
77. ——— & DAS, N. C. : On recall lapse in infant death reporting. Submitted to *Sankhyā*.
78. VARADARAJAN, V. S. : On a theorem of Riesz. To appear in *Fundamental Matzhe-matica*.
79. ——— : Measures on Topological Spaces. To appear in *Mat. Sbronik Moscow*.
80. ——— : On simple and uniform topology in space of measures. Submitted to *Proceedings of American Mathematical Society*.
81. ——— : On the matrizability of simple topology on space of measures. Submitted to *Proceedings of American Mathematical Society*.

### 5.3 PAPERS READ AT CONFERENCES (AS YET UNPUBLISHED)

82. BANERJI, R. B. : Radio-measurement of Inospheric Drift as a Problem in Parameter Estimation. Read at the International Symposium on Statistical Methods in Radio Propagation, University of California, June, 1958.

83. HALDANE, J. B. S. and SPURWAY, H. : The regulation of air breathing in the *Koï, anabus testudineus*. *Proc. of the 45th session of the Indian Science Congress, Madras, 1958*.
84. LAHIRI, DEBABRATA : Recent developments in the use of techniques for assessment of errors in national surveys in India. *Int. Stat. Inst. Confs. Stockholm, 1957*.
85. ——— : Observations on the use of interpenetrating samples in India. *Int. Stat. Inst. Confc. Stockholm, 1957*.
86. MAHALANOBIS, PRASANTA CHANDRA : Some observations on the World Census of Agriculture 1960—*International Statistical Conference, Stockholm (1957)*.
87. MITRA, SHIB K. : Transition from School to College (Paper read at the Vice-Chancellor's Conference on University Administration, New Delhi, 1957. To be Published by the Ministry of Education and Scientific Research, Government of India).
88. ——— : Problems of psychometrics in India (Paper submitted for symposium on 'Psychology and National Planning', to be organized by the Delhi Branch of the Indian Psychological Association).
89. MUKHERJEE, M. and SASTRY, N. S. R. : An estimate of Tangible Wealth in India. Presented to the International Conference on revenue and wealth, 1957.
90. RAO, C. R. : Quantitative studies in Sociology, Need for increased use in India. *Proc. Third All India Sociological Conference, Agra (February 1958)*.
91. ——— : Characterisation of the normal distribution from certain properties of linear estimates in the theory of least squares. *Proceedings of the Colloquium on Probability and Statistics, Paris (July 1958)*.

#### 5.4 WORKING PAPERS AND NOTES

92. AHMED, M. : The effect of the size of a factory on certain relations between capital, labour output and earnings.
93. BANERJEE, USHANATH : A note on certain aspects of trading industry and occupation in Calcutta in 1953.
94. BANERJEE, USHANATH & UMAKANTASHAWRA, S. N. : A note on the contribution to National Income by Joint Stock Companies in India.
95. BANERJEE, USHANATH, ROY J. & UMAKANTASHAWRA, S. N. : On the need for sample survey of trading and transport enterprises.
96. BISWAS, A. K. : Input-Output analysis and general equilibrium.
97. CHAKRAVARTI, A. K. : On discrimination on consumer patterns. Submitted for *Sankhyā*.
98. ——— : Estimation of contribution to national income by plantation, 1953-54.
99. CHAKRAVARTI, A. K. and SENGUPTA, S. SANKAR : On some simple illustrative dynamic inter-industry models.
100. CHATTERJEE, S. : Relation between manifest and inventoried interest of college-fresh man. PRS-R 7-18.
101. ——— : Interest pattern of school boys of a town in Bihar. PRS-R57-19.
102. ——— : Development of a non-verbal interest inventory. PRS-R57-15.

## INDIAN STATISTICAL INSTITUTE

103. DAS, RHEA S. : Development and validation of a battery of aptitude tests for card-punch operators. PRS-R-58-20.
104. E. A. UNIT : National Income of India in 1956-57 : A tentative estimate.
105. ——— : Data on national income, consumption and accumulation relating to the People's Republic of China for the period covered by the First Five-Year Plan.
106. EZHOV, A. I. : On the system of training of statistical personnel in the USSR.
107. GHOSH, M. N. and PIPLAI, T. : Increased food production and its effects on the transportation system.
108. GHOSH, P. K. : On the extent of improvements in Economic Classification during the last two decades.
109. INTER-INDUSTRY UNIT : Inter-Industry relations of the Indian economy (1953-54), at market price).
110. JOSHI, KALPANA : A note on the nature of the basic data on large industrial establishments in India.
111. KANSAL, S. M. : First notes on consumption pattern.
112. ——— : On the deflation of the National Income in India by the final expenditure approach.
113. ——— and BHATTACHARYYA, M. : A note on consumption.
114. KEYSERLING, LEON H. : Aspects of planning in the United States economy.
115. ——— : Aspects of planning in the Indian economy.
116. MITRA, SHIB K. : A factor analysis of examination marks. PRS-T57-04.
117. ——— : A scale of study habits. PRS-R-57-10.
118. ——— : On the characteristics of a good item. PRS-R-57-08.
119. ——— : Computational procedures for some selection test statistics. PRS-S-7-03.
120. ——— A multi-factor test battery. PRS-R57-09.
121. ——— : Analysis of Biographical questionnaire 157. PRS-R57-07.
122. ——— : Analysis of Abstract Reasoning 956. PRS-T57-03.
123. MUKHERJEE, M. : A note on the estimation of future need of technical man-power in India.
124. MUKHERJEE, M. On the appropriateness of the price average to be used for obtaining the value of output in agriculture.
125. NAIR, K. G. C.; GOSWAMI, S. K. & RAMACHANDRAN, K. : Some aspects of Small-scale Manufacture and handicrafts.
126. NAIR, K. G. C., & RAMAKRISHNA, M. : Census Economic Classification.
127. NARASIMHAN, N. V. A. : Statistical evidence on acceleration principle in Indian Railways during 1919-1952.
128. ——— : Supply function of India's export and marginal wage and raw material quotas during 1919-1952.
129. ORTHABAR, ALBIN : Planning in Yugoslavia.
130. PRAKASH, VINOD : A flow chart of agricultural commodities.
131. ——— : An estimate of stock of precious metal.

132. ROY, J. and DHAR, S. K. : A study of the pattern of consumer expenditure in rural and urban India.
133. RUDOLPH, JOHANNES : Balance of national economy an instrument of long term planning (with a special study showing the elaboration of a branch plan-energy sector).
134. ——— : Some problems of planning the development of the national economy in the German Democratic Republic.
135. SEN, T. K. : An empirical study of correction formulae in item analysis. PRS-R57-11.
136. ——— : An empirical study of reliability formulae. PRS-R57-12.
137. ——— and CHATTERJEE, S : Development of a differential aptitude test battery. PRS-R57-16.
138. SENGUPTA, S. SANKAR, CHAKRAVARTI, A. K. and AGARWAL, V. K. : On an application of inter-industrial relations (1951-52).
139. SOM, R. K. and BHATTACHARYYA, G. C. : Some finding of the try-out on agriculturall labour enquiry 1956.
140. SOM, R. K., BHATTACHARYYA, G. C. & NAMBOODIRI, N. K. : Type studies on peak period of harvesting of *Aman* paddy in West Bengal, December, 1954—January 1955.

Appendix 6

LIST OF MANPOWER STUDIES\*

no,	title	year
1	A report on the coverage and quality of information regarding engineers in the national register of technical personnel	April 1957
2	A preliminary study of the pattern of engineering employment in manufacturing industries in India	May 1957
3	A preliminary study of employment of engineers in electricity supply undertakings—present position and basis for estimating future requirements	July 1957
4	A preliminary study of training and employment of agricultural graduates in India	August 1957
5	Engineers in India : number and distribution, 1955	October 1957
6	A preliminary study of chemists and chemical technologists in India : 1955	November 1957
7	A preliminary study of physicists in India, 1955	March 1958
8	Approach to Manpower Planning	April 1958
9	Educated persons in India, 1955	May 1958
10	Occupational pattern in manufacturing industries : India 1956	May 1958
11	A study of Geologists in India : 1955	July 1958
12	A study of Biologists in India : 1955	July 1958

\* Reports prepared by the Perspective Planning Division of the Planning Commission in collaboration with the Indian Statistical Institute (Delhi Unit).

# INDIAN STATISTICAL INSTITUTE

## Appendix 7

### LIBRARY

1. The Central Library is located in the main Institute building at 203, Barrackpore Trunk Road. Owing to lack of accommodation, however, periodicals prior to 1931 and the personnel of the Translation Unit had to be shifted during the year to 204, Barrackpore Trunk Road. Service centres were maintained at the City Office and Giridih.

2. *Books* : The number of volumes in the library at the end of March 1958 were about 68000 volumes made up as follows :—Statistics (theoretical and applied): 18000; Mathematics: 3000; Physical and Biological Sciences: 6000; Economics and its subsidiary branches: 18000; Anthropology, Sociology, Psychology and other social sciences: 8000; Engineering and Technology: 6000; Humanities: 6000 and General Reference Works: 3000. These figures include the bound volumes of periodicals. During the year, the library accessioned 4328 volumes as against 3556 in the previous year: of these 936 were gifts, 365 were received in exchange and the rest were purchased.

3. *Periodicals* : 1390 periodicals were received during the year as against 1297 in the previous year. Of these, 322 periodicals were subscribed, 443 were gifts and 639 were received in exchange. Subscriptions to 5 periodicals were discontinued and the library stopped receiving 7 complimentary and 2 periodicals in exchange. 24 daily newspapers were subscribed for the news clipping files which are maintained for reference in connexion with work on statistics and planning in India.

4. *Special Collection*: Books in the Russian, Japanese and Chinese languages were received through the exchange agreements with learned institutions in those countries.

The organization of the photo-duplicated material in the library has been completed. The collection now consists of 248 microfilm rolls running to over 2072 feet and containing 21984 exposures and 7787 pages of paper prints.

5. *Bibliographical Services* : 3 reading lists on Statistical Quality Control, Hydrology and National Income were compiled from available material. The library regularly issues a weekly list of selected periodicals, a monthly index to current literature and a monthly bulletin of acquisitions and library news.

6. *Translation* : The most notable work of the Translation Unit was a complete English translation and publication of the Russian book "Industrial Statistics" by A. I. Ezhov. The English edition consists of 322 pages. 31 other documents were also translated into English, of which 26 were from Russian, 2 from French, 2 from Chinese and from German. The Japan Reference and Translation Unit made available translations of 15 Japanese documents.

7. *News Clippings* : The systematic processing and indexing of newspaper cuttings, relating to statistics and planning in India, from important dailies and periodicals were continued. Clippings are gathered regularly from 24 representative Indian dailies. The clippings, processed and indexed during the year, numbered 6770, bringing the total to 27340. The indexing of articles from newspapers and other periodicals including supplements was resumed during the year and 972 articles were indexed.

8. *Service and Circulation* : 1171 persons used the library during the year as against 995 in the previous year. Books, journals and other materials issued numbered 56719, as

TWENTYSIXTH ANNUAL REPORT : 1957-58

against 46271 in the previous year. Of these, 16204 were issued from the Lending Section and 21,166 from the Reference Section. Bound volumes of periodicals (issued for reference only) number 19349. Requests received numbered 65297 of which about 13.3% could not be met as against 14.5% last year.

9. *Circulating Library* : 1024 workers used the Circulating Library during the year. The new acquisitions were 768 Bengali books, 177 English, 35 Hindi and 7 Oriya, bringing the total to 8497 volumes. The stocks were rotated among the different branches of the library. Books issued from Calcutta and Giridih numbered 21,968 and 4395 respectively.

10. *Records Unit* : The classification and indexing of 1332 office files and miscellaneous papers were compiled. This brings the number of completely processed papers to 14,022 files. The schedules of the ninth round of the National Sample Survey were also processed and indexed. The large number of diaries received from the Cost Accounts Section and crop survey records from Giridih are being processed. 6606 sheets of Cadastral Survey maps and 2470 sheets of provincial and district maps of India were repaired. Maps issued for reference to the Field Branch and other sections numbered 8354, of which 7398 were returned and 956 sheets were lying with the borrowers at the end of the year.

11. *Photographic Unit* : The Photographic Unit worked under considerable disadvantage during the year. The development programme could not be carried out for want of accommodation and a major part of the projected work for providing auxiliary facilities for research and training had to be kept in abeyance. However, the routine work was carried out as usual. Documentary reproduction work consisted of 2107 frames of microfilm, 3243 prints from microfilms and 3164 photostats. The Photographic Unit took 1354 photographs of individuals, groups and important functions at the Institute. 900 feet of motion picture film were exposed and more than half of this was in colour. 1903 bromide enlargements were also made. Other work included the preparation of slides, photo-reproductions, hand-finished reproductions, and film printing. A number of requests from other Institutions for reproduction of documents were also met.

Appendix 8

MECHANICAL TABULATION EQUIPMENT AT DIFFERENT CENTRES

machine	Calcutta				Giridih	Delhi		total
	Holle-rith	IBM	Russian	Powers Samas	Holle-rith	Holle-rith	IBM	
<i>April 1957 to September 1957</i>								
Accounting Machine	6	7	2	1	2	1	2	21
Electronic Machine	—	1	—	—	—	—	—	1
Sorter	6	10	4	2	4	3	2	29
Calculating Punch	—	3	—	1	1	—	1	6
Collator	1	3	—	1	1	1	—	7
Reproducer, Gang Punch and Summary Punch	8	9	2	3	4	2	2	30
<i>October 1957 to March 1958</i>								
Accounting Machine	6	8	2	—	3	1	2	22
Electronic Machine	—	1	—	—	—	—	—	1
Sorter	6	12	4	—	5	3	2	32
Calculating Punch	—	4	—	—	1	—	1	6
Collator	1	3	—	—	1	1	—	6
Reproducer, Gang Punch and Summary Punch	8	10	2	—	4	2	2	28

# INDIAN STATISTICAL INSTITUTE

## Appendix 9

### LIST OF TRAINEES IN DIFFERENT COURSES

#### 9.1 OFFICER ON DEPUTATION

K. R. Mazloun, Ministry of Social Services, Egypt. (Study and research in Sampling techniques and Sociology).

#### 9.2 RESEARCH SCHOLARS AND ONE-YEAR APPRENTICE TRAINEES

1. Pradyot Kumar Bhattacharyya (*Statistical Inference*), 2. R. L. Brahmachary (*Theoretical Physics and Biology*), 3. V. S. Varadarajan (*Advanced Probability*), 4. S. P. Sangal (*Psychometry*), 5. Sushil Kumar (*Psychometry*), 6. T. K. Sen (*Psychometry*), 7. Sudhin Roy (*Multivariate Analysis*), 8. R. A. Gangolli (*Mathematical Statistics*), 9. Subodh Kumar Roy (*Biometry*), 10. D. K. Rao (*Genetics*), 11. S. Chatterjee (*Psychometry*), 12. D. D. Joshi (*Theory of Information*), 13. Amar Mani Pradhan (*Psychometry*), 14. Somesh Das Gupta (*Psychometry*), 15. S. John (*Multivariate Analysis*), 16. P. N. Kalra (*Industrial Psychology*) 17. K. N. Sharma (*Industrial Psychology*).

#### 9.3 TRAINEES ADMITTED TO THE FIRST YEAR CLASS IN JULY 1957 (QUALIFICATIONS AND NAMES OF UNIVERSITIES ARE NOTED AGAINST EACH)

1. Dev Swarup Ahluwalia, B.A.(Hons), (*Delhi*); 2. Chaman Lal Bambroo, M.A. (*Lucknow*); 3. Kailash Narayan Gaur, M.Sc. (*Agra*); 4. Miss Pushpa Jain, B.A.(Hons), (*Delhi*); 5. Aridaman Kumar Jain, B.Sc.(Hons), (*Delhi*); 6. Chandra Shekhar Joshi, M.Sc., (*Nagpur*); 7. Prem Nath Kapoor, M.A., (*Punjab*); 8. P. K. Kumaran, B.Sc. (Hons), (*Travancore*); 9. R. Narayanan, B.A. (Hons), (*Madras*); 10. K. S. Ramachandra Moorthy, B.A. (Hons), (*Andhra*); 11. Prabhala Krishna Murty, B.Sc.(Hons), (*Andhra*); 12. Dharam Prakash, M.Sc., (*Allahabad*); 13. A. V. Prakasham, B.A.(Hons), (*Andhra*); 14. Miss Indra Rani, B.A.(Hons), (*Delhi*); 15. K. Rajaraman, B.A.(Hons), (*Madras*); 16. K. Govinda Ramulu, B.A.(Hons), (*Madras*); 17. Arza Kesava Rao, B.A.(Hons), (*Andhra*); 18. Peddibhotla Bhaskara Rao, M.A. (*Andhra*); 19. Kadiyala Koteswara Rao, B.Sc. (Hons), (*Andhra*); 20. Paras Nath Singh, M.Sc. (*Banaras*); 21. Sucharit Sarkar, M.Sc. (*Patna*); 22. Mangat Ram Saluja, M.A. (*Delhi*); 23. N. Srinivasan, B.Sc. (Hons), (*Madras*); 24. J. M. Sundaram, B.A.(Hons), (*Madras*); 25. L. Satyanarayana, M.Sc. (*Andhra*); 26. Kaluvakolanu Madhava Sarma, B.A.(Hons), (*Andhra*); 27. Nanak Chand Tyagi, M.Sc. (*Banaras*); 28. R. Thyagarajan, B.A.(Hons), (*Madras*).

#### 9.4 TRAINEES PROMOTED TO THE SECOND YEAR CLASS IN JULY 1957 (QUALIFICATIONS AND UNIVERSITIES ARE NOTED AGAINST EACH)

1. Ram Mohan Arora, M.A. (*Lucknow*); 2. Balabhadrapatruni Sreeram Chandramurty, M.Sc. (*Banaras*); 3. Miss Shahana Chatterjee, M.Sc. (*Agra*); 4. Miss Thekkaneth Verghese Grace, M.A. (*Madras*); 5. Siva Ramaswami Iyer, M.Sc. (*Banaras*); 6. Surendra Kumar Jain, M.Sc. (*Rajputana*); 7. Vasant Tukaram Korde, M.Sc. (*Nagpur*); 8. Subramania Iyer Krishnamorthy, B.Sc.(Hons), (*Travancore*); 9. Mudigonda Srigiri Kumar, B.A.(Hons), (*Travancore*); 10. Taresh Maitra, M.Sc. (*Calcutta*); 11. Perrajarao Malyala, M.Sc. (*Andhra*); 12. Miss Manjula Mukherjee, M.Sc. (*Calcutta*); 13. Kowtha Adinarayana Murty M.A. (*Osmania*); 14. K. Jagadish Chandra Neelaratna, M. A. (*Banaras*); 15. Sriballabh Pande, M.Sc. (*Lucknow*); 16. Ganesan Parthasarathy, B.A.(Hons), (*Madras*); 17. Kalyanapuram

TWENTYSIXTH ANNUAL REPORT: 1957-58

Rangachi Parthasarathy, B.A.(Hons), (*Madras*); 18. Balasubramanyan Ramachandran, B.A.(Hons), (*Madras*); 19. Ramachandran Ramanathan, B.A.(Hons), (*Madras*); 20. Aryana-nayakipuram Venkataraman Ramsundar, B.Sc.(Hons), (*Nagpur*); 21. Banda Venkata Lakshmi Narasimha Rao, B.A.(Hons), (*Andhra*); 22. Jammalamadaka Sudarsana Rao, B.Sc.(Hons), (*Andhra*); 23. Moreswar Narayan Sapre, M.Sc. (*Nagpur*); 24. Cidambi Anantachari Seshadri, B.A.(Hons), (*Madras*); 25. Ajit Kumar Sinha, M.Sc. (*Allahabad*); 26. Vakkalamka Subbarao, B.S.(Hons), (*Madras*); 27. Miss Gumpeni Sugunakumari, M.Sc. (*Madras*); 28. Krishnamurthy Srinivasan, B.A.(Hons), (*Madras*); 29. Pudukkottah Balakrishna Thiagarajan, B.A.(Hons), (*Madras*); 30. Maropalli Suryanarayana Murty, M.A. (*Banaras*).

9.5 TRAINEES DIRECTLY ADMITTABLE TO THE SECOND YEAR CLASS AFTER A QUALIFYING TEST (QUALIFICATIONS AND NAMES OF UNIVERSITIES ARE NOTED AGAINST EACH)

1. N. M. Raman, B.Sc.(Hons), (*Madras*); 2. Bipin Behari Choubey, M.Sc. (*Nagpur*); 3. M. K. Mani, B.Sc.(Hons), (*Madras*); 4. Natarajan Subra Mani, B.Sc.(Hons), (*Mysore*); 5. R. Natarajan, M.Sc. (*Travancore*).

9.6 TRAINEES OF THE THIRD YEAR CLASS DURING 1957-58 (QUALIFICATIONS AND NAMES OF UNIVERSITIES ARE NOTED AGAINST EACH)

1. Sitamraju Balakrishna, B.A.(Hons), (*Madras*); 2. Kuchibhatla Bhanumurthy, M.A. (*Madras*); 3. Yenagudde Krishna Bhat, B.Sc.(Hons), (*Madras*); 4. K. A. Chandrasekharan, B.Sc.(Hons), (*Madras*); 5. Miss Gajra Mohini Shanti Swaroop, M.Sc. (*Bombay*); 6. Jagadish Chandra Gupta, M.A. (*Agra*); 7. Sripati Subbarya Gupta, B.Sc.(Hons), (*Madras*); 8. Narasimha Sreenivasa Iyengar, B.Sc.(Hons), (*Mysore*); 9. Sukhdev Khosla, M.A. (*Punjab*); 10. Narayan Shankarrao Kandalgoankari, M.A. (*Bombay*); 11. Kosuraju Leela Krishna, M.Sc. (*Travancore*); 12. Halasyam Krishnamurthy, B.A. (Hons), (*Madras*); 13. Desu Manavala Mohamunulu, M.A. (*Madras*); 14. Vemuri Murali Mohan, M.A. (*Osmania*); 15. Prakash Nath, M.A. (*Punjab*); 16. Anandhapurath Sankaramenon Pankajakshan, M.Sc. (*Travancore*); 17. Manashi Ramachandran, M.A. (*Madras*); 18. Krishnamurti Ramachandran, B.Sc. (Hons), (*Madras*); 19. S. Ramamurti, B.A.(Hons), (*Madras*); 20. Ganti Narasimha Rao, B.A. (Hons), (*Andhra*); 21. Peri Bhaskara Rao, M.A. (*Banaras*); 22. Ramaswami Iyer Ranga Rao, B.A. (Hons), (*Madras*); 23. Anand Swarup, M.A. (*Banaras*); 24. Madhabhushanan Venkatachari, M.A. (*Osmania*); 25. Krishnaswamy Raghavan, M.A. (*Punjab*).

9.7 TRAINEES OF THE ISEC ELEVENTH TERM: JULY 1957 to APRIL 1958

*Burma*. 1. Mr. Tha Tun Aung, 2. Mr. Than Shwe; *India*. 3. Mr. B. P. Singh, 4. Mr. Chandra Shekhar Jha, 5. Mr. Sati Pati Bhattacharyya; *Ceylon*. 6. Mr. R. C. Amarasingham; *Iran*. 7. Ali Madani; *Japan*. 8. Mr. Michiaki Seki, 9. Makio Nakazawa; *Philippines*. 10. Mr. C. L. Corpuz, 11. Mr. Miguel Calizto, 12. Mr. Romulo T. Pajarito, 13. Miss Aurora O. Faraon; *Singapore* 14. Mr. Chew Siong Peck; *Thailand* 15. Mr. Prasert Kanchanavasita, 16. Mr. Nobondha Paorohitya, 17. Miss Vilai Pianprasurd, 18. Miss Nangyao Watananukul.

## INDIAN STATISTICAL INSTITUTE

### 9.8 TRAINEES OF THE JUNIOR OFFICER'S COURSE (DEPUTING CENTRE, SUBJECT OF SPECIALISATION AND PERIOD OF TRAINING ARE NOTED AGAINST EACH)

1. Sri Sadashiv Dattatray Diwanji, *Bombay* (9 months, Planning Statistics)
2. Sri Rajendra Swarup Bhatnagar, *Himachal Pradesh* (9 months, National Income Estimation),
3. Sri A. V. Gavaskar, *New Delhi* (6 months).
4. Sri N. Karunakara Menon, *Kerala State* (9 months, Sample Survey).
5. Sri Parthasarathi Gupta, *Agartala* (6 months),
6. Sri Hariprasad Chaliha, *Assam* (9 months, Planning Statistics),
7. Sri Mahesh Chandra Asthana, *Hyderabad* (9 months, Agricultural Statistics).
8. Sri Jagannath Singh, *Lucknow* (6 months),
9. Sri Monmohan Swarup, *Lucknow* (9 months, Planning Statistics).
10. Sri S. Krishnaswamy, *New Delhi* (9 months, Sample Survey).
11. Sri H. R. Vohra, *New Delhi* (9 months, Sample Survey).
12. Sri K. N. Hiriyaniah, *New Delhi* (9 months, Sample Survey).
13. Sri Gopal Krishna Patnaik, *Orissa* (9 months, Vital Statistics and Census)
14. Sri K. V. Natarajan, *Bombay* (6 months),
15. Sri Y. Satyanarayana, *Hyderabad* (9 months, Sample Survey),
16. Sri Lal Krishan, *Lucknow* (6 months),
17. Sri B. S. Shivanna, *Bangalore* (9 months, Agricultural Statistics).
18. Sri Jitendra Nath Patnaik, *Orissa* (9 months, Planning Statistics).
19. Sri Satish Kumar Mathur, *New Delhi* (9 months, Machine Tabulation).

### 9.9 TRAINEES IN THE SHORT-TERM STATISTICIAN'S TRAINING COURSE : MARCH 1957 to SEPTEMBER 1957 (QUALIFICATIONS AND NAMES OF UNIVERSITIES ARE NOTED AGAINST EACH)

1. Pankajendra Mohan Acharyya, B.Sc. (*Calcutta*); 2. Mahfooz Ahmed, M.A. (*Aligarh*);
3. Kanwar Manmohan Singh Bedi, M.A. (*Punjab*); 4. Nirmal Bhattacharyya, B.Com. (*Bihar*);
5. Suraj Banerjee, B.A. (*Calcutta*); 6. Shankar Narayan Bhattacharjee, B.Sc. (*Calcutta*);
7. Sukumar Banerjee, B.Sc. (*Calcutta*); 8. Satyendra Kumar Bhattacharjee, B.Sc. (*Calcutta*);
9. Karuna Nidhan Chatterjee, A.M.I.E. 10. Amiya Bhusan Chatterjee, B.Sc. (*Calcutta*);
11. Salil Chatterjee, B.Sc. (*Calcutta*); 12. Sushil Kumar Chatterjee, B.Sc. (*Calcutta*); 13. Arabinda Nath Dey, B.Sc. (*Calcutta*); 14. Miss Mukul Dutta, B.A., B.T. (*Calcutta*); 15. Asim Kumar Dutta, B.Sc. (*Calcutta*); 16. Pabitra Kumar Das Gupta, B.Sc., B.Com. (*Calcutta*);
17. Pranab Brata Dutta, B.Com. (*Calcutta*); 18. Gopal Krishna Das Gupta, M.A. (*Calcutta*);
19. Nikhil Ranjan Dhar, B.Sc. (*Calcutta*); 20. Amaleudu Das Gupta, B.Sc. (*Calcutta*); 21. Nitendra Bhusan Ghosh, B.Sc. (*Calcutta*); 22. Dharmendra Kumar Gupta, M.Sc. (*Agra*);
23. Jwala Prasad Kacher, M.Sc. (*Agra*); 24. T. K. Kothandaraman, B.A.(Hons), (*Madras*);
25. Miss Mylavarpur Lalita, B.A. (*Andhra*); 26. Samir Kumar Mazumdar, B.Sc. (*Calcutta*);
27. Sunil Kumar Mazumdar, B.Sc. (*Calcutta*); 28. Asish Chandra Nandi, B.Sc. (*Gauhati*);
29. Madimpalli Lakshmi Narasimhan, B.A. (*Andhra*); 30. Nihar Kanti Nag, M.Sc. (*Calcutta*);
31. Kshitish Chandra Paul, B.Sc. (*Calcutta*); 32. Tapan Kumar Paul, B.Sc. (*Calcutta*);
33. Nanigopal Paul, B.Sc. (*Calcutta*); 34. Palanki Hanumantha Rao, B.A. (*Andhra*); 35. Prasanta Kumar Roy, B.Sc. (*Calcutta*); 36. Mrs. Parul Roy Chowdhury, B.Sc. (*Calcutta*);
37. Vuppuluri Venkata Gangadhara Sastry, M.A. (*Madras*); 38. Irving Sivin, M.A. (*Columbia*);

39. Sambhu Nath Sen, B.Sc. (*Calcutta*); 40. Jitendra Kumar Sarkar, B.Sc. (*Calcutta*); 41. Parimal Kumar Sarkar, B.Sc. (*Calcutta*); 42. Pranab Kumar Sarkar, B.Sc. (*Calcutta*); 43. Narayan Chandra Sen, B.Sc. (*Calcutta*); 44. Suranjan Sen, B.Sc. (*Calcutta*); 45. Arun Kumar Sen Gupta, B.Sc. (*Calcutta*); 46. P. S. Subramanian, B.Sc. (Hons), (*Annamalai*); 47. Mihir Kumar Sarkar, B.Sc. (Hons), B.E. (*Eng*), (*Calcutta*); 48. Manoranjan Sarkar, B.Sc. (*Calcutta*); 49. Jai Krishna Sharma, B.Sc. (*Agra*); 50. Alok Kumar Sarkar, B.Sc. (*Calcutta*); 51. Raj Chandra Sen Gupta, B.Com (*Calcutta*); 52. Maharaj Kumar Vuppuluri, B.Sc. (*Osmania*); 53. T. S. Veliah, B.Sc. (*Madras*).

9.10 TRAINEES IN THE SHORT-TERM STATISTICIAN'S TRAINING COURSE : SESSION SEPTEMBER 1957 TO MARCH 1958 (QUALIFICATIONS AND NAMES OF UNIVERSITIES ARE NOTED AGAINST EACH)

1. Samir Ranjan Joti, B.Sc. (*Calcutta*); 2. Bimal Krishna Nayek, B.Sc. (*Calcutta*); 3. Kalyan Kumar Sen Gupta, B.Sc. (*Calcutta*); 4. Atindra Bhusan Gupta, B.Sc. (*Calcutta*); 5. Amritlal Sharma Choudhuri, B.Sc. (*Calcutta*); 6. Bibhas Chandra Shasmal, B.Sc. (*Calcutta*); 7. Milan Kumar Das Gupta, B.Sc. (*Calcutta*); 8. Mrinal Kanti Samanta, B.Sc. (*Calcutta*); 9. Miss Susmita Ghosh, B.Sc. (*Calcutta*); 10. G. Munaswamy Naidu, B.A. (*Andhra*); 11. Asoke Guha Thakurtha, B.Sc. (*Calcutta*); 12. Sanat Kumar Das, B.Sc. (*Calcutta*); 13. S. Devarajan, B.A. (*Madras*); 14. Biswanath Chatterjee, B.Sc. (*Calcutta*); 15. Anil Kumar Ghosal, B.Sc. (*Calcutta*); 16. Jibnath Roy Choudhury, B.Sc. (*Calcutta*); 17. Dulal Mukherjee, M.Sc. (*Calcutta*); 18. Devi Prosad Roy, B.Sc. (*Calcutta*); 19. Sudhir Kumar Deb, B.A. (*Calcutta*); 20. Ganesh Chandra Guria, B.Sc. (*Calcutta*); 21. Asim Kumar Mukherjee, B.Sc. (*Calcutta*); 22. Narinder Kumar Sahni, M.A. (*Punjab*); 23. Dilip Kumar Sinha Roy, B.Sc. (*Calcutta*); 24. Sibhendu Lahiri, B.Sc. (*Banaras*); 25. Khetragopal Hazra, B.Sc. (*Calcutta*); 26. L. N. N. Appa Rao, B.Sc. (*Andhra*); 27. Sm. Ava Chakravarti, B.Sc. (*Calcutta*); 28. Kamal Kanti Guha, B.Sc. (*Calcutta*); 29. Mrs. Gita Dutta, B.Sc. (*Calcutta*); 30. Rabindra Nath Banerjee, B.Sc. (*Calcutta*); 31. Subal Chandra Chatterjee, B.Sc. (*Calcutta*); 32. Sankar Nath Banerjee, B.Sc. (*Calcutta*); 33. Arup Ratan Sarkar, B.Sc. (*Calcutta*); 34. Manindra Chandra Basu, B.Sc. (*Calcutta*); 35. Susanta Kumar Mukherjee, B.Sc. (*Calcutta*); 36. Panchanon Duari, M.Sc. (*Calcutta*); 37. Sankar Nath Halder, B.Sc. (*Calcutta*); 38. Sukumar Roy, B.Sc. (*Calcutta*); 39. Rabindra Mullick, B.Sc. (*Calcutta*); 40. S. N. Subramanian, B.Sc. (*Madras*); 41. Sankar Narayan Bhattacharjee, B.Sc. (*Calcutta*); 42. Karamjit Singh Ahlowala, M.A. (*Punjab*); 43. Ramesh Chandra Awasthi, M.Com. (*Agra*); 44. K. Subramania Srinivasan, B.Sc. (*Madras*); 45. Sanat Kumar Bhattacharjee, B.Sc. (*Calcutta*); 46. R. G. Rajan, B.Sc. (*Calcutta*); 47. Arun Chandra Roy, B.Sc. (*Dacca*); 48. Ajit Kumar Maitra, B.Sc. (*Calcutta*); 49. Sushil Krishna Goswami, B.Sc. (*Calcutta*).

9.11 TRAINEES IN THE SHORT-TERM STATISTICIAN'S TRAINING COURSE (SENIOR) : SESSION SEPTEMBER 1957 TO MARCH 1958 (QUALIFICATIONS AND NAMES OF UNIVERSITIES ARE NOTED AGAINST EACH)

1. Alok Kumar Sarkar, B.Sc. (*Calcutta*); 2. Mihir Kumar Sarkar, B.A. (*Calcutta*); 3. Suraj Banerjee, B.A. (*Calcutta*); 4. K. M. Singh Bedi, M.A. (*Punjab*); 5. Jai Krishan Sharma, B.Sc. (*Agra*); 6. T. S. Veliah, B.Sc. (*Madras*); 7. N. L. Narasimhan B.A. (*Andhra*); 8. Swaminatha Srinivasan, B.Sc. (*Madras*).

## INDIAN STATISTICAL INSTITUTE

### 9.12 TRAINEES IN THE SHORT-TERM STATISTICIAN'S TRAINING COURSE (SENIOR) SESSION : MARCH 1957 TO SEPTEMBER 1957 (QUALIFICATIONS AND NAMES OF UNIVERSITIES ARE NOTED AGAINST EACH)

1. Kanakendra Nath Dutta, B.Sc. (*Calcutta*);
2. Chandra K. Mustafi, B.Sc. (*Calcutta*);
3. T. Raghupati, B.A. (Hons), (*Andhra*);
4. Swaminatha Srinivasan, B.Sc. (*Madras*);
5. Sankar Bhaduri, B.Sc. (*Calcutta*);
6. Upadrasta Muralikrishnan, B.Sc. (*Andhra*);
7. Surendra Kumar Soni M.Sc. (*Rajasthan*);
8. Madhava Chandra Munshi, B.A.(Hons), (*Rajasthan*);
9. Kamalendu Nath Dutta Roy, B.Sc. (*Calcutta*);
10. Nirmalendu Bhowmik, M.Sc. (*Calcutta*);
11. Bansidhar Patnaik, B.A. (*Utkal*);
12. Manish Sen, B.Sc. (*Calcutta*).

### 9.13 TRAINEES IN COURSES IN PSYCHOMETRIC METHODS OF PERSONNEL SELECTION FROM HINDUSTAN AIRCRAFT (PRIVATE) LTD. (DATES OF ATTENDANCE ARE NOTED AGAINST EACH)

1. N. Vaidyanathan, (3rd February to 21st February, 1958);
2. Deb Kamal Roy, (3rd February to 21st February, 1958);
3. R. Nanjunda Rao, (3rd February to 28th March, 1958);
4. V. N. Keshav, (3rd February to 28th March, 1958);
5. P. K. Mukundan (17th March to 4th April, 1958).

### 9.14. TRAINEES IN THE COMPUTER'S TRAINING COURSE. SESSION : SEPTEMBER 1957 TO MARCH 1958. (QUALIFICATIONS AND NAMES OF UNIVERSITIES ARE NOTED AGAINST EACH)

#### *Junior class (morning) :*

1. Samir K. Dutta Chowdhury, I.Sc. (*Calcutta*);
2. Prasanta Kumar Saha, B.Sc. (*Calcutta*);
3. Anil Rajan Das, B.Sc. (*Calcutta*);
4. Manzarul Hassain, B.Com. (*Calcutta*);
5. Dilip Banerjee, I.Sc. (*Calcutta*);
6. Bhutesh Kumar Ghosh, B.Sc. (*Calcutta*);
7. Tapanesh Roy, I.Sc. (*Calcutta*);
8. Samiran Das Gupta, B.A. (*Calcutta*);
9. Jogeswar Ghosh, B.Sc. (*Calcutta*);
10. Sunil Dutta, I.Sc. (*Calcutta*);
11. Mohit Kumar Biswas, I.Sc., (*Calcutta*);
12. Shyamal Kanti Sen Gupta, I.Sc. (*Calcutta*);
13. Susanta Kumar Mukherjee, I.Sc. (*Calcutta*);
14. Barindra Nath Paul, I.Sc. (*Calcutta*);
15. Jiban Kumar Chatterjee, B.Sc. (*Calcutta*);
16. Krishna Narayan Mondal, B. Sc. (*Calcutta*);
17. Basudeb Bhattacharyya, B.Sc. (*Calcutta*);

#### *Junior Class (evening) :*

1. Timir Baran Goswami, I.Sc. (*Calcutta*);
2. Bimalhari Mukhopadhaya, M.A. (*Calcutta*);
3. Tridib Kumar Das Gupta, I.Sc. (*Calcutta*);
4. Mukul Krishna Chatterjee, I.Sc. (*Calcutta*);
5. Ashish Kumar Dalal, B.Sc. (*Calcutta*);
6. Nripendra Chandra Sarkar, I.Sc. (*Calcutta*);
7. Prabhat Kumar Khan, B.Sc. (*Calcutta*);
8. Bimalendu Goswami, I.Sc. (*Calcutta*);
9. Samir Kumar Dutta, I.Sc. (*Calcutta*);
10. Jahar Lal Das Gupta, B.Sc. (*Calcutta*);
11. Kalipada Bhattacharyya, I.Com. (*Calcutta*);
12. Ajit Kumar Mitra, I.Sc. (*Calcutta*);
13. Chitta Ranjan Mukherjee, I.Sc. (*Calcutta*);
14. Chitta Ranjan Karati, I.Sc. (*Calcutta*);
15. Subodh Chandra Das, B.Sc. (*Calcutta*);
16. Badri Vishal Shrotriya, I.Sc. (*U.P. Board*);
17. Bhabani Prasad Bhattacharjee, I.Sc. (*Calcutta*);
18. Sita Ram Tibrewal, I.Com. (*Calcutta*);
19. Murari Mohan Bhattacharjee, I.Sc. (*Calcutta*);
20. Santimoy Sen Gupta, I.Sc. (*Calcutta*);
21. Netai Chandra Dutta, I.Sc. (*Calcutta*);
22. Sukhamoy Ghosh, I.Sc. (*Calcutta*).

*Senior Class (evening) :*

1. Santosh Kumar Ghosh, B.Sc. (*Calcutta*); 2. Bikash Chandra Coomar, I.Sc. (*Calcutta*);
3. Tapan Kumar Roy Chowdhury, B.Sc. (*Calcutta*); 4. Kamal Kanti Ball, I.Sc. (*Calcutta*);
5. Kamakhya Chowdhury, I.Sc. (*Calcutta*); 6. Prabir Kumar Chattopadhyaya, I.Sc. (*Calcutta*);
7. J. Arun Kumar Das Gupta, B.Sc. (*Calcutta*); 8. Asim Kumar Dutta, B.Sc. (*Calcutta*); 9.
- Shital Prosad Sinha, I.Sc. (*Calcutta*); 10. Satyendra Nath Borai, I.Sc. (*Calcutta*); 11. Shib
- Shankar Basak, B.Sc. (*Calcutta*); 12. Shome Chand Basak, B. Sc. (*Calcutta*); 13. Samir Kumar
- Basu, B.Sc. (*Calcutta*); 14. Manindra Narayan Chowdhury, B.Sc. (*Calcutta*); 15. Nirmal
- Jyoti Gangopadhyay, I.Sc. (*Calcutta*); 16. Nayan Ranjan Paul, B.Sc. (*Calcutta*); 17. Khagendra
- Nath Manna, I.Sc. (*Calcutta*); 18. Rajendra Nath De, B.Sc. (*Calcutta*); 19. Santosh Kumar
- Bhattacharjee, B.Sc. (*Calcutta*); 20. Rabindra Nath Das, I.Sc. (*Calcutta*).

**Appendix 10**

LIST OF SUCCESSFUL CANDIDATES IN PROFESSIONAL EXAMINATIONS

10.1 STATISTICIAN'S DIPLOMA EXAMINATION, SEPTEMBER, 1957

A. GENERAL PAPERS

*Paper I (Theoretical) :* V. V. G. Sastry (C5), Amalendu Sengupta (C13), Mangho Morandmal Ahuja (D3), Kultar Singh Bedi (D6), Mohan Pathak (P1), Nilkanth Gangadhar Bapat (P7), Sudhakar Dhundiraj Joshi (B7), Raghunath Shankar Abhyankar (B11), Shreeram Ganesh Pande (B15).

*Paper II (Theoretical) :* Sukumar Chakravarti (C22), Ranajit Kumar Naha (C23), Shanti Sagar Tandon (D13), R. Srinivasa Bashyam (D16), Dharamvir Gultai (D18), Bhagwati Prosad Dyundi (D27).

*Paper III (Theoretical) :* U. Murali Krishna (C1), Sankar Bhaduri (C3), Tallapragada Raghupathi (C11), Nirmal Kanti Dasgupta (C16), Dhara Singh Sharma (D14).

*Paper VI (Theoretical) :* Shankar Bhaduri (C3), P. Hanumanta Rao (C4), V. V. G. Sastry (C5), Nirmal Kanti Dasgupta (C16), Sukumar Chakrabarti (C22). Tilak Raj Talwar (D15), Arwind Parashuram Joag (P2), Sashikant Mathure (B12), Narayan Mahabaleshwar Palekar (B16), Aravamudu Rangarajan (B17).

*Paper VII (Theoretical) :* U. Murali Krishna (C1), P. Hanumanta Rao (C4), Nirmal Kanti Dasgupta (C16), Sukumar Chakravarti (C22), Jugal Kishore Sharma (D4), C. L. Gupta (D17), Balaram Kohli (D19), Krishna Lal Kohli (D24), Ramesh Laximan Kamat (B10).

B. SPECIAL PAPERS

*Paper IV and V (Theoretical) :*

*Sample Surveys (Theory) :* Avelino Josep Romanus Gonsalves (B1), Sadashiv Vasudeo Walimbe (P4), Arun Prabhakar Kulkarni (P8).

*Sample Surveys (Applied) :* Manoj Chatterjee (C12), Asoke Dasgupta (C17), Sukumar Chakrabarti (C22), Pranbadhu Das (C27), Shanti Sagar Tandon (D13), R. Srinivasa Bashyam (D16), Dharamvir Gulati (D18), Rajeshwar Dayal Saksena (D33), Sadashiv Vasudeo Walimbe (P4), Arun Prabhakar Kulkarni (P8), Avelino Josep Romanus Gonsalves (B1).

## INDIAN STATISTICAL INSTITUTE

*Design of Experiments (Applied)* : Tallaparagada Raghupathi (C11), Srikantan Viswanath (B18), Bhagwati Prasad Dyundi (D27).

*Statistical Quality Control* : U. Murali Krishna (C1), (Miss) Ela Romala Mukerji (C8), Surendra Kumar Soni (C9), Tallaparagada Raghupathi (C11), Ranajit Kumar Naha (C23), Srish Chandra Basu Roy (C26), Shanti Sagar Tandon (D13), Bharamvir Gulati (D18), Darshan Singh (D21).

*Vital Statistics and Population Studies* : (Miss) Attivilli Sita Devi (C7).

*Psychology and Education* : Sourindra Mohan Mukhopadhyaya (C30).

*Paper VIII and IX (Practical)* :

*Sample Surveys (Theory)* : Jugal Kishore Sharma (D4), R. L. Khanna (D5), Charan Singh Growal (D26), Sadashiv Vasudeo Walimbe (P4), Arun Prabhakar Kulkarni (P8).

*Design of Experiments (Applied)* : Srikantan Viswanath (B18), Charan Singh Growal (D26).

*Statistical Quality Control* : Sashikant Kashinath Gadgil (B9), Ramesh Laximan Kamat (B10), Sharashchandra Gopal Moghe (B13), Surendra Kumar Soni (C9), Nirmal Kanti Dasgupta (C16).

### 10.2 COMPUTER'S CERTIFICATE EXAMINATIONS, SEPTEMBER 1957

*Part IA, Sec. I* : Tapan Kumar Roy Chowdhury (C5), Prabir Kumar Chattopadhyay (C6), Kshirode Krishna Deb (C8), Deb Kumar Chatterjee (C12), Kamakshya Chowdhuri (C16), Arun Kumar Dasgupta (C22), Ganesh Chandra Guria (C23), Rabindra Nath Das (C24), Nirmal Jyoti Gangopadhyay (C25), Arup Ratan Sarkar (C45), Satyabrata Sengupta (C51), (Miss) Manjusree Bhattacharyya (C78), Sukesh Debnath (C81), Sanat Kumar Maity (C85), Biman Mukherjee (C88), Barun Kumar Bose (C106), Gopal Chandra Biswas (C110), Santosh Kumar Bhattacharyya (C120), Madhusudan Chandra (C121), Subal Chandra Chatterjee (C122), Shivapada Das (C125), Atindra Bhusan Gupta (C127), Nayan Ranjan Pal (C128), Biswanath Bandyopadhyaya (C129), Satyendra Nath Boral (C130), Shib Shankar Basak (C131), Jaikrishna Sharma (C133), Satyendra Kumar Niyogi (C136), Santosh Kumar Ghosh (C137), Bimal Kumar Nayak (C138), Prokash Chandra Das (C139), Sailendra Chandra Paul (C142), Rajendra Nath De (C143), Rati Ranjan Ghosh, (C144), Kamal Kanti Ball (C145), Khagendra Nath Manna (C147), Debiprosad Roy (C148), Gopal Chandra Roy (C151), Ramasamy Alwar Reddy (D5), Rajanikant Jayantilal Bhatt (P2).

*Part IA, Sec. II* : Samar Krishna Basu (C3), Tapan Kumar Roy Chowdhury (C5), Prabir Kumar Chattopadhyay (C6), Kshirode Krishna Deb (C8), Kamakshya Chowdhuri (C16), Arun Kumar Dasgupta (C22), Ganesh Chandra Guria (C23), Nirmal Jyoti Gangopadhyay (C25), Sunil Kumar Bhattacharyya (C36), Arup Ratan Sarkar (C45), Amiya Kumar Sinha (C53), Dulal Chowdhuri (C62), Ram Chandra Neogi (C64), Amarendra Nath Ghosh (C71), Sukesh Debnath (C81), Sanat Kumar Maity (C85), Sunirmal Bose (C98), Kulada Ranjan Biswas (C99), Prasanta Sen (C107), Madhai Lal Mukhopadhyay (C114), Keshab Chandra Das (C115), Bidyut Kumar Banerjee (C119), Shivapada Das (C125), Radha Krishna Basak (C135), Santosh Kumar Ghosh (C137), Rabindra Mohan Sanyal (C140), Rajendra Nath De (C143), Rati Ranjan Ghosh (C144), Kamal Kanti Ball (C145), Khagendra Nath Manna (C147), Ramasamy Alwar Reddy (D5), Dinabandhu Ghosh (G3).

## TWENTYSIXTH ANNUAL REPORT : 1957-58

*Part IB, Sec. I :* Salil Kumar Das (C21), Badal Basu Mallick (C33), Goutam Sanyal (C35), Manik Ratan Acharyya (C39), Subodh Kumar Paul (C42), Nagendra Nath Das (C44), Arup Ratan Sarkar (C45), Manik Mukherjee (C65), Monoj Chatterjee (C69), Amarendra Nath Ghosh (C71), Biswadan Chatterjee (C76), Sourendra Nath Paul (C77), Provash Mukherjee (C86), Kalidas Neogy (C94), Kulada Ranjan Biswas (C99), Gopal Chandra Biswas (C110), Kalidas Chatterjee (C111), Chittaranjan Banerjee (C112), Madhai Lal Mukhopadhyaya (C114), Arun Chandra Chakravarti (C117), Madhusudan Ramachandra Khanwelkar (P1).

*Part IB, Sec. II :* Benayendra Goswami (C9), Badal Basu Mallick (C33), Goutam Sanyal (C35), Sunil Kumar Bhattacharyya (C36), Nirendra Nath Sarkar (C52), Ajit Kumar Chatterjee (C60), Arun Kanti Ghosal (C116), P. Venkata Rao (C123), Nirmalananda Banerjee (C150).

*Part IC, Sec. I :* Alok Kumar Sarkar (C17), Sunil Kumar Bhattacharyya (C36), Manik Ratan Acharyya (C39), Dibakar Ghosh (C40), Mihir Kumar Rakshit (C41), Devendra Kumar Devnath (C54), Nirmal Kumar Chowdhuri (C55).

*Part IC, Sec. II :* Alok Kumar Sarkar (C17), Dibakar Ghosh (C40), Nagendra Nath Das (C44), Susil Kumar Tapadar (C49), Amiya Kumar Sinha (C53), Devendra Kumar Devnath (C54), Nirmal Kumar Chowdhuri (C55), Tusar Kanti Banerjee (C61), Tincawri Paul (C70), Sanjit Kumar Banerjee (C75), Sanat Kumar Das (C84), Provash Mukherjee (C86), Kalidas Neogy (C94), Arun Chandra Chakravarti (C117).

### 10.3 STATISTICAL FIELD SURVEY CERTIFICATE EXAMINATION, SEPTEMBER 1957

*Junior :*

*Part I Sec. A :* Suresh Chandra Chakravarti (C1), Dharam Pal Kapil (L6), Asit Ranjan Lahiri (C2).

*Part I Sec. B :* Asit Ranjan Lahiri (C2), Charam Pal Kapil (L6).

*Part I Sec. C :* Asit Ranjan Lahiri (C2), Dharam Pal Kapil (L6).

*Senior :*

*Part II Sec. A :* B. M. L. Bharititya (L2), Laxmi Prasad Tiwari (L3), Dharam Pal Kapil (L6), Ramakant Anant Prabhu (P1).

### 10.4 STATISTICIAN'S DIPLOMA EXAMINATION, MARCH 1958

#### A. GENERAL PAPERS

*Paper I (Theoretical) :* Gurramkonda Munaswamy Naidu (C4), Sankar Bhaduri (C9), Manish Sen (C20), K. Govinda Rajulu (C21), Mihir Kumar Sarkar (C23), Sunil Kumar Mazumdar (C31), Akhil Nath Bhattacharyya (C32), Suraj Bandhyopadhyay (C42), Sudhansu Kumar Mazumdar (D4), Tarun Kumar Gupta (D5), Sewak Ram Chawla (D9), Rajpal Singh Verma (D12), Shanti Sagar Tandon (D21), Dharam Vir Gulati (D28), Sham Sundar Narula (D34), Bal Ram Kohli (D35), Ram Sarup Mehta (D36), Darshan Singh (D38), Ranjit Singh Goel (D41), Ashok Kanchanlal Parikh (B1), Govind Bajirao Joshi (B8), Shreeram Ganesh Pande (B9), Rameshchandra Vishvanath Thakur (B11), Ghhakkilal Prajapat (L1), Surendra Nath Sinha (L4), Prem Shanker Bhargava (L5).

## INDIAN STATISTICAL INSTITUTE

*Paper II (Theoretical)* : Manish Sen (C20), Mihir Kumar Sarkar (C23), R. G. Ranjan (C24), Viswanath Nikore (C28), Suraj Bandyopadhyay (C42), Tarum Kumar Gupta (D5), Brij Mohan Pal Khullar (D13), Ashok Kanchanlal Parikh (B1), Raghunath Shankar Abhyankar (B2), Meghasham Bhaskar Usgaunkar (B3), Govind Bajirao Joshi (B8), Shashikant Mathure (B13), Narayan Mahabaleshwar Palekar (B14), Kakhan Lal Razdan. (P1), Nilkant Gangadhar Bapat (P4), Arwind Parashuram Joag (P7).

*Paper III (Theoretical)* : Manish Sen (C20), K. Govinda Rajulu (C21), Sudhansu Kumar Mazumdar (D4), Basant Lal Sethi (D17), Ranjit Singh Goel (D41), Avelino Jose Romanus Gonsalves (B10), Shashikant Mathure (B13),

*Paper VI (Practical)* : V. R. Rajagopala Sarma (C13), Mihir Kumar Sarkar (C23), Ranajit Kumar Naha (C41), Nirmal Kumar Chowdhury (C45), Samir Ranjan Guha Roy (C47), Sham Sundar Narula (D34), Raghunath Shankar Abhyankar (B2), Chhakkilal Prajapat (L1), A. Padmanabha Aiyar (L2).

*Paper VII (Practical)* : Nirmalendu Bhowmik (C1), Gour Gopal Rudra (C2), C. R. Rajagopala Sarma (C13), Asoke Kumar Das Gupta (C15), Mihir Kumar Sarkar (C23), Ranjit Kumar Naha (C41), Suraj Bandyopadhyay (C42), Monoj Chatterjee (C46), Amalendu Sen Gupta (C51), Sewak Ram Chawala (D9), Dharam Vir Gulati (D28), Bhagwati Prasad Dyundi (D29), Gopal Dev Ahluwalia (D46), Triloke Khosla (B6), Vasudeo Vyasacharya Ghalsasi (B7), Shreeram Ganesh Pande (B9), Shashikant Mathure (B13), Narayan Mahabaleshwar Palekar (B14), Arwind Parashuram Joag (P7), Rajendra Kumar Tripathi (L3).

### B. SPECIAL PAPERS

*Papers IV and V (Theoretical)* :

*Statistical Quality Control* : Gaur Gopal Rudra (C2), T. S. Veliah (C3), Jai Krishna Sharma (C27), Sourindra Mohan Mukherjee (C36), Brij Mohan Pal Khullar (D13), Ashok Kanchanlal Parikh (B1), Govind Bajirao Joshi (B9), Rameshchandra Vishvanath Thaker (B11), Narayan Mahabaleshwar Palekar (B14), Rajendra Kumar Tripathi (L3), A. Mathu Subramanian (BB3).

*Sample Surveys (Applied)* : T. S. Veliah (C3), Jagdish Lal Kapoor (D6), Pritam Dass (D15), Krishna Chandra Agarwal (D22), Ravi Prakash Sawhney (D31), Krishan Chander Seth (D39), D. S. Ramaratnam (D51),

*Sample Surveys (Theory)* : R. Srinivasa Bashyam (D27), Bhagwati Prasad Dyundi (D29), Brij Mohan Mahajan (D47), Rajendra Kumar Tripathi (L3).

*Economic Statistics* : Ashok Kanchanlal Parikh (B1), Meghasham Bhaskar Usgaundar (B3), Shashikant Kashinath Gadgil (B4), Ramesh Laximan Kamat (B5), Govind Bajirao Joshi (B8), Rameshchandra Vishvanath Thakar (B11), A. Muthu Subramanian (BB3).

*Vital Statistics and Population Studies* : Bal Ram Kohli (D35).

*Psychology and Education* : Brij Mohan Pal Khullar (D13), Basant Lal Sethi (D17).

*Papers VII and IX (Practical)* :

*Statistical Quality Control* : Nirmalendu Bhowmik (C1), Gour Gopal Rudra (C2), Asoke Kumar Das Gupta (D13), Upadrasta Murali Krishna (C33), Sourindra Mohan Mukherjee (C36), Ranjit Kumar Naha (C41), Samir Ranjan Guha Roy (C47), Prakash Chandra

## TWENTYSIXTH ANNUAL REPORT : 1957-58

Kundu (C48), Raj Kumar Nandy (C50), Govind Bajirao Joshi (B8), Shreeram Ganesh Pande (B9), Narayan Mahabaleshwar Palekar (B14), Arwind Parashuram Joag (P7), Rajendra Kumar Tripathi (L3).

*Sample Surveys (Applied)* : Nirmalendu Bhowmik (C1), Gour Gopal Rudra (C2),

*Sample Surveys (Theory)* : Bhagwati Prasad Dyundi (D29).

*Economic Statistics* : Govind Bajirao Joshi (B8).

*Design of Experiments (Applied)* : S. Harihara Aiyar (P3).

*Papers VIII and IX (Practical)* :

*Mathematical Theory of Sampling Distribution* : Arwind Parashuram Joag (P7).

*Psychology and Education* : Sourindra Mohan Mukherjee (C36).

*Theories of Inference* : V. R. Rajagopala Sarma (C13).

### 10.5 COMPUTER'S CERTIFICATE EXAMINATION, MARCH 1958

*Part 1A, Section I* : Sunilim Dutta (C49), Satyendra Nath Chatterjee (C53), Jiban Kumar Chattopadhyay (C58), Bhabani Prasad Bhattacharji (C60), Prabhat Kumar Khan (C66), Barindra Nath Paul (C67), Manzarul Hasnain (C72), Mohit Kumar Biswas (C73), Samir Kumar Basu (C74), Dilip Banerjee (C77), Sita Ram Tibrewal (C83), Sunil Kumar Pakhira (C95), Hrishikesh Chakrabarti (C114), Sudhangshu Bimal Ghosh (C123), Dilip Kumar Sinha Roy (C126), Radha Ballava Rakshit (C127), Anil Kumar Mohapatra (C135), Dulal Chandra Banerjee (C140).

*Part 1A, Section II* : Satyendra Kumar Niyogi (C22), Mohit Kumar Biswas (C73), Samir Kumar Basu (C74), Manik Chandra Ambali (C76), Somesh Chandra Saha (C101), Anil Kumar Mohapatra (C135), Gopal Chandra Biswas (C154), Monoj Chatterjee (C162).

*Part 1B, Section I* : Netai Chandra Dutta (C7), Debabrata Chanda (C18), Kamakhya Chowdhuri (C71), Prasun Sengupta (C120), Shib Shadhan Banerjee (C122), Rabindra Nath Basu (C124), Syamal Kumar Sen (C141), Bidyut Kumar Banerjee (C166), Amalendu Sengupta (C175).

*Part 1B, Section II* : Debabrata Chanda (C18), Arup Ratan Sarkar (C24), Manindra Chandra Basu (C25), Samir Kumar Basu (C74), Kalidas Chatterjee (C165).

*Part 1C, Section I* : Bimalendu Mahalanobis (C144), Provash Mukherjee (C146), Sanjit Kumar Banerjee (C148), Monoj Chatterjee (C163), Robindra Nath Mukherjee (C172).

*Part 1C, Section II* : Pranabananda Bhaduri (C2), Ram Chandra Neogi (C13), Dipak Sen (C51), Nirmal Krishna Chaudhuri (C79).

### Appendix 11

#### ADMINISTRATIVE AUTHORITIES

*President* : Sri Chintaman D. Deshmukh.

*Vice-Presidents* : Dr. P. N. Banerjee, M.A., D.Sc.; Professor S. N. Bose, F.R.S.; Professor D. R. Gadgil, M.A., M.Litt.; Sir Shri Ram; Professor D. G. Karve, M.A.; Dr. Zakir Hussain, Ph.D.

# INDIAN STATISTICAL INSTITUTE

THE COUNCIL, 1957-58

*Chairman* : Sir D. N. Mitra

*Vice-Chairmen* : Dr. S.K. Banerji, D.Sc.; Sri K. P. Goenka, Sri S. C. Ray, M.A., B.L.; Professor N. R. Sen, M.A., B.L.

*Treasurer* : Dr. Satya Churn Law, M.A., B.L., Ph.D., F.N.I., F.Z.S., M.B.O.U.

*Secretary* : Professor P. C. Mahalanobis, F.R.S., D. Sc.

*Joint Secretaries* : Sri Nihar Chandra Chakravarti, M.A.; Sri S. C. Sen, B.A. (*Cantab*); Sri Pitambar Pant, M.Sc.

*Members* : Srimati Chameli Bose, B.Sc., (Lond.); Professor K. N. Chakravarti, M.Sc.; Sri Nistarān Chakravarti, M.A. (*Cantab*); Sri V. M. Dandekar, M.A.; Sri Mohanlal Ganguli, B.Sc. (Lond.); Professor H. C. Ghosh, M.A., P.R.S.; Sri N. C. Ghosh, M.A.; Dr. Q. M. Husain, M.A., Ph.D.; Sri S. P. Sinha, I.A.S.; Professor K. B. Madhava, M.A., A.I.A.; Srimati Nirmal Kumari Mahalanobis; Sri N. T. Mathew, M.A., M. Sc.; Sri D. N. Mukherjee, M.L.A.; Sri Moni Mohan Mukherjee, M.A.; Dr. U. S. Nair, M.A., Ph.D.; Sri R. Natarajan; Dr. B. Ramamurti, M.Sc., Ph. D.; Dr. C. R. Rao, M.A., M.Sc., Ph.D. (*Cantab*); Dr. N. Sundararama Sastry, M.A., M.Sc., Ph.D. (Lond.); Sri Sadasiv Sengupta, M.Sc. (*Dacca*), B.Sc. (*Lond.*); *Ex-officio members* : Sri A. Ananthapadmanabha Rau, President, Mysore State Branch; Sri Srinagabhushana, Secretary, Mysore Branch; Dr. Jivraj N. Mehta, President, Bombay Branch; Sri M. A. Telang, Joint Secretary, Bombay Branch; Professor D. P. Mukherjee, President, Aligarh Branch; Sri A. Salim, Secretary, Aligarh Branch.

## GOVERNING BODY OF THE RESEARCH AND TRAINING SCHOOL, 1975-58

Sir D. N. Mitra, Chairman (*ex-officio*); Professor P. C. Mahalanobis, F.R.S., D.Sc., Director-Secretary, (*ex-officio*); Sri Bali Ram Bhagat, Deputy Minister of Finance, Government of India; Sri P. A. Gopalkrishnan, I.C.S., Joint Secretary to the Cabinet, Government of India; Dr. N. S. R. Sastri, M.A., M.Sc., Ph.D. (Lond), Director of Statistics, Department of Research & Statistics, Reserve Bank of India, Bombay; Dr. U. S. Nair, M.A., Ph.D., Professor of Statistics, University of Travancore, Trivandrum; Mr. George Barrell, Managing Editor, Capital (Private) Ltd.; Sri D. N. Mukherjee, M.L.A.; Dr. V. G. Panse, Ph.D. (Lond.), F.N.I., Statistical Adviser, Indian Council of Agricultural Research; Dr. J. P. Niyogi; Sir Shri Ram; Dr. S. K. Banerji, D.Sc.; Professor S. N. Bose, D.Sc., Vice-Chancellor, Visva-Bharati University; Professor K. B. Madhava, M.A., A.I.A., F.N.I.; Sri N. C. Chakravarti, M.A.; Dr. C. R. Rao, M.A., M.Sc., Ph.D. (*Cantab*); Sri Pitambar Pant, M.Sc.,

## COMMITTEE OF THE COUNCIL & GOVERNING BODY

### FINANCE COMMITTEE

Professor P. C. Mahalanobis, Sri P. A. Gopalkrishnan, I.C.S., Sri D. N. Mukherjee, M.L.A., Sri N. C. Chakravarti, Dr. C. R. Rao,

## COMMITTEES OF THE COUNCIL

### FINANCE COMMITTEE

Sir D. N. Mitra, Chairman (*ex-officio*); Dr. S. C. Law, *Treasurer (ex-officio)*; Professor P. C. Mahalanobis, Honorary Secretary (*ex-officio*); Sri S. C. Ray; Sri P. A. Gopalkrishnan; Sri D. N. Mukherjee; Sri S. C. Sen; Sri N. C. Chakravarti, Joint Secretary (*Member-Secretary*); Dr. N. R. Sen; Sri S. P. Sinha.

JOURNAL COMMITTEE

Professor S. N. Bose; Dr. Debabrata Basu; Dr. Raghu Raj Bahadur; Sri D. B. Lahiri; Professor K. B. Madhava; Professor P. C. Mahalanobis, Editor, *Sankhyā* (*ex-officio*); Professor Moni Mukherjee; Dr. C. R. Rao; Dr. N. S. R. Sastry (*representative of the Governing Body of the Research and Training School*); Sri A. Mahalanobis, *Member-Secretary*; Sri M. L. Ganguli; Sri N. T. Mathew; Dr. P. B. Patnaik (*representative of the Governing Body of the Research and Training School*).

EXAMINATIONS COMMITTEE

Dr. S. K. Banerjee; Sri N. C. Chakravarti; Sri V. M. Dandekar; Sri M. L. Ganguli; Sri D. Y. Lele; Professor K. B. Madhava; Professor P. C. Mahalanobis; Sri N. T. Mathew; Dr. U. S. Nair; Sri Pitambar Pant; Dr. C. R. Rao; Dr. N. S. R. Sastry; Sri J. M. Sengupta; Sri Sadasiv Sengupta; Sri N. C. Ghosh; Sri K. N. Chakravarti; Sri S. R. Rao; Sri M. A. Telang; Srimati C. Bose; Sri S. C. Chowdhury, *Member-Secretary*.

COMMITTEE OF THE GOVERNING BODY

FINANCE COMMITTEE

Sir D. N. Mitra, Chairman (*ex-officio*); Director of the Research & Training School (*ex-officio*); Professor P. C. Mahalanobis, Secretary (*ex-officio*); Sri N. C. Chakravarti (*representing Governing Body*); Mr. George Barrell (*representing Governing Body*); Dr. N. S. R. Sastry (*representing Reserve Bank of India*); Sri P. A. Gopalkrishnan (*Joint Secretary to the Cabinet, Government of India*); Sri M. S. Bhatnagar (*Joint Secretary, Ministry of Finance, Government of India*).

BRANCHES

MYSORE STATE BRANCH

Sri A. Ananthapadmanabha Rau (*President*); Sri S. K. Rana (*Vice-President*); Sri Srinagabhusana (*Secretary*); Sri S. M. Sundara Raju (*Joint Secretary*); Sri R. Ramaswami (*Treasurer*).

BOMBAY BRANCH

Dr. Jivraj N. Mehta (*President*); Dr. N. S. R. Sastry, Sri R. G. Saraiya, Sri L. S. Vaidyanathan (*Vice-Presidents*); Sri M. A. Telang (*Joint Secretary*); Dr. D. T. Lakdawala (*Treasurer*).

INTERNATIONAL STATISTICAL EDUCATION CENTRE

BOARD OF DIRECTORS

Chairman : Professor P. C. Mahalanobis.

Members : Mr. G. Darmois, Mr. R. G. D. Allen, Mr. E. Lunenberg, (*International Statistical Institute*) (*ex-officio*); Sri P. A. Gopalkrishnan, (with Sri S. K. Bose as *alternative*) (*Government of India*); Dr. C. R. Rao, Sri A. Das, Dr. A. Mathai, (*Indian Statistical Institute*) (*Secretary*).

**Appendix 12**

**Indian Statistical Institute: Receipts and Payments Account**

		<i>To Receipts</i>	
		Rs. nP.	Rs. nP.
1. Opening balance :			
i) Cash in hand and at Banks with Central Office ..		26,616.93	
ii) With branches and sub-offices .. .. .		35,731.69	
iii) Unadjusted suspense of 1956-57 .. .. .		1,46,069.39	2,08,418.01
2. Loans due from staff for educational and house-building purposes etc. as per last account .. .. .			22,241.28
3. Membership subscription .. .. .			4,528.02
4. Machine fees for Training courses in Calcutta and Delhi .. .. .			18,787.50
5. Examination fees and other receipts .. .. .			27,810.13
6. S.Q.C. membership and training fees including service charges .. .. .			96,181.14
7. Recoveries for work done by workshop etc. .. .. .			20,418.31
8. Block and Project grants from the Government of India for :			
i) Research and Training School and Society type activities sector .. .. .		8,16,500.00	
ii) International Statistical Education Centre .. .. .		73,800.00	
iii) Statistical Quality Control Sector .. .. .		2,00,000.00	
iv) Computing machines and Electronic Laboratory Sector .. .. .		2,89,000.00	
v) Utilisation of Soviet (UNTAA) equipment Sector .. .. .		2,21,200.00	
vi) Economic Wing Sector .. .. .		2,14,800.00	
vii) Operational Research Unit for Planning Sector .. .. .		3,00,000.00	
viii) Industrial Management and Research Unit for Planning Sector .. .. .		2,04,100.00	
xi) Pilot Project for surveys in Regional Planning (in Mysore) .. .. .		82,500.00	
x) National Sample Surveys and Integrated Activities Sector .. .. .		48,77,500.00	72,79,400.00
9. Block Grant received from the Director-General of Health Services, Government of India for conducting certain studies .. .. .			25,000.00
10. Received by recovery from the Government of India of expenditure incurred by the Institute on account of UNTAA (Soviet) experts during the year 1956.57 .. .. .			7,020.00
11. Development grant received from Government of India in lieu of supervision fees .. .. .			2,50,000.00
12. Amount received from the United Nations for preparation of a paper on population .. .. .			7,143.00
13. Amount received from F.A.O., Rome for preparation of a Manual .. .. .			4,762.00
14. Funds received from the Government of India Ministry of Finance for disbursement to the trainees of the ISEC (under the Technical Co-operation Scheme, Colombo Plan) .. .. .			56,000.00

Rs. 80,27,709.39

TWENTYSIXTH ANNUAL REPORT : 1957-58

(current expenditure) for the year ending 31 March 1958

	<i>By Payments</i>	Rs. nP.	Rs. nP.
1. i) Salary, dearness allowance, honorarium etc. ..	..	40,63,083.86	
ii) Employer's contribution to workers Provident Fund ..	..	2,22,672.69	
iii) Overtime allowance .. .. .	..	1,20,829.38	44,06,585.93
2. Contribution to Leave Salary Fund .. .. .	..	..	2,20,000.00
3. Contribution to Gratuity Fund .. .. .	..	..	1,65,000.00
4. Travelling allowances .. .. .	..	..	2,10,304.34
5. Visiting Professors, Fellows, Foreign experts and scientists etc. for the			
i) SQC sector .. .. .	..	22,064.94	
ii) Electronic Laboratory sector .. .. .	..	324.27	
iii) O.R.U. sector .. .. .	..	62,939.31	
iv) Regional Planning sector .. .. .	..	6,134.53	
v) NSS sector .. .. .	..	10,471.70	1,01,934.75
6. i) Visiting Professors and Scientists for R.T.S. sector (funded : vide fund account) .. .. .	..	50,000.00	
ii) Scholarships, stipends etc. to trainees of the R and T School (funded : vide fund account) .. .. .	..	1,50,000.00	2,00,000.00
7. Fellowship allowance and other assistance to ISEC Non-Colombo Plan trainees .. .. .	..	..	2,442.89
8. Disbursement of fellowship allowance to ISEC trainees under Colombo Plan .. .. .	..	..	51,117.67
9. Prizes to workers for initiative etc. .. .. .	..	..	16,460.00
10. Machine Tabulation expenses :			
a) Hire and maintenance of tabulating equipment, key punches and verifiers including freight, transport, electricity charges, etc. .. .. .	..	8,76,576.84	
b) Cost of cards, cabinets etc. .. .. .	..	1,52,699.61	
c) Payments to IBM, Powers-Samas and Gokhale Institute of Politics and Economics, Poona for tabulation of NSS data .. .. .	..	14,229.09	10,43,505.54
11. Printing and Publication (including paper for printing) .. .. .	..	..	84,899.99
12. Society type activities .. .. .	..	..	33,378.37
13. Examination expenses .. .. .	..	..	27,104.44
14. Books and Journals (including cost of binding etc.) .. .. .	..	..	94,963.55
15. Workshop, photo and microfilm .. .. .	..	..	24,700.88
16. Laboratory and Workshop stores, tools and minor accessories etc. .. .. .	..	..	94,082.13
17. Repars and replacement of machineries, equipment, accessories, furnitures and fittings etc. .. .. .	..	..	94,997.81
18. Stationeries and consumable stores .. .. .	..	..	1,11,945.04
19. Auditor's fees .. .. .	..	..	4,000.00
20. Bank charges and interest .. .. .	..	..	9,546.77
21. Telephone, postage, telegram, advertisement, freight charges etc. .. .. .	..	..	71,463.94
			<u>Rs. 70,68,434.04</u>

INDIAN STATISTICAL INSTITUTE

Indian Statistical Institute: Receipt and Payments Accounts

<i>To Receipts</i>		Rs. nP.	Rs. nP.
Brought Forward	..	..	80,27,709.39
15. Miscellaneous receipts :	..		
a) Donations and contributions	.. ..	678.68	
b) Sale proceeds of waste paper, cards etc.	.. ..	2,188.18	2,866.86
16. Amount received as sale proceeds of Institute's own publications			11,638.25
17. Deposit accounts	.. ..	..	9,362.17
18. Outstanding liabilities for goods and services obtained	..	..	1,02,475.03
19. Recovery of loan given to Capital Expenditure account as shown in the audited accounts of 1956-57	.. ..	..	1,72,218.48
20. Temporary loan taken from funded accounts :			
a) as per last account	.. ..	3,40,000.00	
b) since added in 1957-58	.. ..	98,000.00	4,38,000.00

Rs. 87,64,270.18

**TWENTYSIXTH ANNUAL REPORT: 1957-58**

(current expenditure) for the year ending 31 March 1958

	<i>By Payments</i>	Rs. nP.	Rs. nP.
	Brought Forward ..	..	70,68,434.04
22.	Other miscellaneous expenses including hot weather contingencies etc. .. .. .	..	66,096.94
23.	Electricity charges .. .. .	..	58,146.88
24.	Rent, rates and taxes (including those of field, camp and outstation offices) .. .. .	..	1,86,231.13
25.	Repairs and maintenance of land and buildings, including petty constructions .. .. .	..	1,21,802.10
26.	Transport .. .. .	..	[55,785.00
27.	Workers' welfare and amenities .. .. .	..	1,23,566.70
28.	Development at Director's discretion .. .. .	..	17,158.59
29.	Transport, freight, installation and storage etc. of Soviet (UNTAA) equipment .. .. .	..	43,061.59
30.	Expenditure for 25th Anniversary celebrations of the Institute adjusted during 1957-58 .. .. .	..	4,995.93
31.	Development grant (transferred to fund account) .. .. .	..	2,50,000.00
32.	Repayment of outstanding liabilities (as per debits shown in in last account) .. .. .	..	1,10,640.83
33.	Repayment of old deposit (as per last account) .. .. .	..	6,988.37
34.	Loans to staff for educational and house-building purposes etc. .. .. .	..	29,585.14
35.	Amount under suspense pending final adjustment :		
	a) part payment to contractors and suppliers against work done or goods supplied or ordered, t. a. advances and other advances awaiting adjustment .. .. .	98,017.61	
	b) for passage, custom deposits etc. of Visiting Professors and Foreign Experts .. .. .	28,215.96	1,26,233.57
36.	Repayment of temporary loan taken from Prof. P. C. Mahalanobis as shown in the audited accounts of 1956-57 .. .. .	..	50,000.00
37.	Temporary loan taken from funded accounts as per last account .. .. .	..	3,40,000.00
38.	Closing balance :		
	i) Cash in hand and at Banks with Central office .. .. .	22,438.02	
	ii) With braches and sub-offices .. .. .	83,105.35	1,05,543.37

Rs. 87,64,270.18

Examined and found correct  
Sd/- P. C. NANDI & Co  
Chartered Accountants and Auditors

## A BRIEF HISTORY OF THE INSTITUTE

1. The beginnings of the Indian Statistical Institute were modest enough: a solitary computer working part-time and a total current expenditure of rather less than Rs. 250— that was all, when it started in April, 1932. In March 1958, the Institute had on its roll 1981 regular workers who were backed by an annual budget allocation of Rs. 81.11 lakhs. Impressive as these figures are, they convey little idea of the nature of the work that is being carried on by the Institute, its wide range, its complex character and the specialization at high scientific levels, that is necessary for carrying out investigations which have an intimate bearing on the life of the nation.
2. A long period of preparatory activity, going back to the early years of the first world war, preceded the formal inauguration of the Institute. Prasanta Chandra Mahalanobis was back in India in 1915 on a short holiday after he had been awarded a senior scholarship of King's College, Cambridge, for research in Physics. Just before his departure from Cambridge, his tutor, W. H. Macaulay, had drawn his attention to the *Biometrika* and Karl Pearson's *Biometric Tables*, copies of which he brought with him to India and which he studied with eager interest while waiting to return to Cambridge for his Physical researches. But he did not return to Cambridge. Accepting the post of a professor of Physics in the Presidency College, Calcutta, he decided to stay back in India and carry on his statistical studies alongside of his work as a teacher of Physics. In Calcutta, he came into intimate contact with the eminent scholar and philosopher, Brajendra Nath Seal, who had a full appreciation of the importance of modern statistical methods and encouraged Mahalanobis to take up this subject as his life's work.
3. Urged by the great savant, young Mahalanobis entered upon his statistical career with gusto. Not content to confine his interest in statistics to merely academic studies, he was soon applying statistical methods for the solution of problems in anthropometry, which led to the formulation of the Generalized Distance ( $D^2$ -statistics). In meteorology, he found ample scope for trying out his new-found tool, enabling him to locate, at a height of about four kilometers above sea level, the region of highest control for changes in meteorological conditions on the surface of the earth; later, this result was confirmed by Franz Baur from physical considerations.
4. More far-reaching from the point of view of national welfare were the results of extensive investigations into rainfall and floods in North Bengal, Orissa and West Bengal. These led not only to suggestions for really effective flood control but also supplied, in later years, some of the basic calculations for two great river valley schemes, namely, the Damodar Valley and the Hirakud Projects.
5. Meanwhile, Mahalanobis had gathered around him several part-time assistants and a group of young research workers to form the nucleus of the Statistical Laboratory, which was located in the Presidency College, Calcutta. Amongst this pioneer band were Sudhir Kumar Banerjee, Subhendu Sekhar Bose, Nistarani Chakraborty and Jaladhar Sarma, the only one amongst the four who is still serving the Institute. Sudhir Kumar who became

the Chief Computer and Subhendu Sekhar, who was the leading spirit amongst the workers of the Institute, have both been cut off by untimely death in the prime of their careers.

6. The Laboratory also had been gradually developing. By 1930 it owned about Rs. 25,000 worth of books, calculating machines and other equipment and had undertaken some enquiries on behalf of the Government departments and private concerns. The first official recognition came in July 1931 with an annual grant of Rs. 2,500 from the Imperial (now Indian) Council of Agricultural Research for Statistical investigations relating to agriculture.

7. The year 1931 marks another milestone in the progress of statistical organization in India. At a meeting convened by P. N. Banerjee (the then Minto Professor of Economics), N. R. Sen (Ghosh Professor of Applied Mathematics) and P. C. Mahalanobis (Professor of Physics, Presidency College) and held on 17 December 1931, with Sir Rajendra Nath Mookerjee in the Chair, a resolution was unanimously adopted to establish the Indian Statistical Institute. The constitution was approved at the end of February and the Institute was formally registered as a non-profit society in April 1932. Branches were established quite early in Mysore, Poona, Bombay, Madras, Lahore, Banaras, Lucknow and Delhi, and the Statistical Laboratory in Calcutta continued to function as the active nucleus of the Institute.

8. This was how the Indian Statistical Institute was formally organized. The first general grant for research and training came in 1935 in the shape of Rs. 5,000 a year from the Government of India. A big development occurred when the Institute took up in 1937 a five-year project, on an expanding scale, to develop a sampling method for estimating the acreage and out-turn of the jute crop in Bengal with the required accuracy at a reasonable cost. Since then, the Institute has been an important centre of sample surveys in the whole world. From this time, the larger part of the income of the Institute began to be derived as contract grants for applied projects and enquiries.

9. The training of officers deputed by Central and State Governments had started from 1932. In the earlier years such training was more or less on an individual basis and over 150 individuals received such training at the Institute between 1932 and 1939. From 1939, the Institute started organized courses of instructions and the training courses gradually developed into the present Research and Training School at a post-graduate level.

10. Examinations for the award of certificates for computers and diploma for statisticians were started in April 1938, and served a real need, and have become quite popular and are held all over India every year.

11. To offer facilities for the publication of research papers in India, it was decided in 1933 to start *Sankhyā : The Indian Journal of Statistics* as the official organ. On the initiative of the Council of the Institute, arrangements were also made to establish an associated non-profit institution, the Statistical Publishing Society to maintain the Eka Press and publish *Sankhya*, which soon became a journal of international recognition.

12. The Indian Statistical Institute had for some time been pleading for a separate statistical section to the Indian Science Congress. These efforts, however, did not bear any fruit and so in 1938 the Institute organized on its own the First Session of The Indian Statistical Conference which continued for several years. The Indian Science Congress agreed to start an independent section for Statistics from 1946.

## INDIAN STATISTICAL INSTITUTE

13. The Institute's research and project work as well as its promotional activities led to world-wide contacts, earned for it international recognition and helped in enlisting active association with it of distinguished foreign statisticians who came out to India to work and lecture in the Institute as visiting professors. The first to come was Professor (now Sir) Ronald A. Fisher, who paid his maiden visit in 1938, repeating it in 1945, 1951, 1954 and 1956. Other visits have followed and, except for an unavoidable break during the Second World War, a stream of distinguished foreign scholars, statisticians as well as specialists in other fields of knowledge, have responded to the invitation of the Institute to come here and work as research workers and guest lecturers.

14. The Institute has thus become a real international centre of research as well as a forum for scholars and scientists from all over the world to work and hold discussions. Mention may be made of a few amongst these distinguished visitors, such as, G. A. Barnard, R. A. Fisher, Richard Goodwin, J. B. S. Haldane, Sir Robert Hall, Nicholas Kaldor, J. R. N. Stone, John Strachey, F. Yates (UK); Russel L. Ackoff, Samuel Alexander, Paul A. Baran, J. K. Galbraith, Morris H. Hansen, Harold Hotelling, W. Hurwitz, Leon H. Keyserling, Simon Kuznets, Alvin Mayne, John Perry Miller, J. S. Neyman, E. R. Ott, Walter A. Shewhart, Abraham Wald, S. S. Wilks, Norbert Weiner (USA); N. N. Bogolyubov, D. D. Degtyar, V. A. Ditkin, A. I. Ezhov, Y. V. Linnik, I. Y. Pisarev, A. I. Polosukhine, M. I. Rubinstein, A. F. Zelinovsky (USSR); Faiz El Khuri, (Beirut); Nathan Keyfitz (Canada); Wang Szu Hua, Hwang Chien To, Tai Shin Kwang (China); Ch. Bettelheim (France); Tosio Kitagawa, Motosaburo Masuyama, R. Minobe (Japan); J. A. Links, E. Lunenberg and J. Tinbergen (Netherlands); Ragnar Frisch (Norway); Q. M. Hussain, M. Ziauddin (Pakistan); Oskar Lange (Poland); H. Wold (Sweden); Arthur Linder (Switzerland); M. C. Athipon P. Ksemasri (Thailand).

15. After the Second World War, the project side of the Institute developed rapidly to meet the increasing need for statistics of the Government. The Sample Survey in Bengal was extended in 1943 to cover both the area sown and the total yield of jute, rice and other important agricultural crops throughout the year. The tabulation on the basis of the two per cent *Y*-sample of the 1941 Population Census started in 1944-45, and various other socio-economic surveys were undertaken.

16. The post-war years have witnessed a rapid expansion and many new developments. The question of stabilization of the Institute had been under consideration of the Government of India since 1938. Sri Chintaman Deshmukh, who has been the President of the Institute since 1945, helped in solving many difficulties; and it was mainly through his efforts that the Research and Training School was established with an initial recurring grant of Rs. 4.5 lakhs from the Government of India from 1949-50. Administrative sponsorship of the Institute was transferred from the Ministry of Education to the Ministry of Finance in 1950, and to the Cabinet Secretariat of the Government of India in 1956. A Governing Body was established in 1952 to look after the affairs of the Research and Training School, subject to general co-ordination of the work of the Institute as a whole by the Council.

17. From about this time, the Institute began to emerge as a national institution. In 1950, the Institute started working on a vast project, namely, the design and analysis of the data of the National Sample Survey, which is collecting comprehensive information relating to social, economic and demographic characteristics on a countrywide basis in the form of two "rounds" of survey every year covering both rural and urban areas.

18. In 1950, the Institute also helped to bring into being, in collaboration with the International Statistical Institute and under the sponsorship of the UNESCO, the International Statistical Education Centre (ISEC), which is being maintained with the financial support of the Government of India. Since then, the ISEC in Calcutta has been providing statistical training to students from many Asian countries; 248 trainees have come up to 1957.

19. Through all these years the Institute had been steadily gaining in prestige both in India and abroad. Professor Mahalanobis was elected a Fellow of the Royal Society in 1945, and acted as the Chairman of the United Nations Sub-Commission on Statistical Sampling from 1947 to 1951; he has been a member of the UN Statistical Commission since 1946 and Chairman since 1954. Several other workers of the Institute enjoy an international reputation and some of the old members of the staff now hold important positions in other places in and outside India. The Institute acted as the host society to the International Statistical Conferences in India in 1951.

20. Since 1949 when Professor Mahalanobis became Honorary Statistical Adviser to the Central Cabinet, the Institute has been more and more closely associated with the Central Statistical Organization (CSO) and other Government agencies in New Delhi. Since 1952, the Institute has been functioning as the focal centre for professional training and research and as a national statistical and computational laboratory.

21. An associated non-profit institution for the development of calculating machines and scientific instruments had been established in 1943 with the approval of the Council of the Institute and a small workshop was started, which, however, did not make much progress. A small workshop was again installed in the Institute in 1950 for the repair and maintenance of desk calculating machines and other equipments. This workshop now in operation. An electronic laboratory was started a little later, where a small electronic analogue computer was designed and constructed in 1953. An electronic digital computer also was purchased. In 1955, arrangements were made to secure a bigger digital computer and a large number of machine tools from the USSR through the United Nations Technical Assistance Administration and further developments are in progress.

22. The Institute has been promoting the introduction of Statistical Quality Control (SQC) for a long time, and it started the earliest courses in this subject in India in 1945-46. A separate SQC Section was established in 1953, which has whole-time units working at Bangalore, Bombay and Calcutta.

23. Still more significant were the developments in 1954. The Indian Statistical Institute was called upon by the Planning Commission to undertake, jointly with the CSO, work on national planning with the dual objective of solving the unemployment problem in 10 years and continuously increasing the national income as rapidly as possible. In November 1954, Prime Minister Nehru inaugurated in the Institute studies relating to planning for national development. This work is carried on with the active collaboration of the CSO, the Department of Economic Affairs (Ministry of Finance) and the Economic Division of the Planning Commission. Many of the foreign experts, who have come to the Institute, have also participated in studies and discussions on planning.

24. On the basis of the above work, a "Draft Plan-Frame" was submitted to the Prime Minister in March 1955, which was accepted in May 1955 by the National Develop-

## INDIAN STATISTICAL INSTITUTE

ment Council as the basis for the formulation of the Second Five-Year Plan. The Institute thus became intimately associated with the work of national planning in India.

25. Since its inception, there has been a continuous expansion in diverse directions of the area of the Institute's activities. But all these developments have been prompted by one common purpose, which unifies the varied activities carried on by the different departments of the Institute : the promotion of national development through the patient collection and analysis of statistical and technical information and their utilization for policy and administrative decisions in a scientific manner.

**Table 13.1**

**ANNUAL CURRENT EXPENDITURE AND NUMBER OF WORKERS  
FROM 1932-33 TO 1957-58**

Year	Expenditure <sup>1</sup> (to nearest 10 rupees)	Number of workers
1931-32	240	1 <sup>2</sup>
1932-33	846	12
1933-34	1,340	13
1934-35	2,110	14
1935-36	4,840	17 <sup>3</sup>
1936-37	6,680	40
1937-38	7,360	48
1938-39	12,260	76
1939-40	16,380	148
1940-41	31,030	195
1941-42	56,710	288
1942-43	2,24,180	240
1943-44	5,38,440	579
1944-45	11,70,940	993
1945-46	13,89,880	942
1946-47	13,75,170	914
1947-48	12,99,320	710
1948-49	17,55,230	649
1949-50	16,11,160	589
1950-51	23,06,590	722
1951-52	18,96,450	572
1952-53	22,63,850	688
1953-54	27,57,870	827
1954-55	35,68,110	1015
1955-56	50,09,310	1420
1956-57	70,38,180	1757
1957-58	77,73,000†	1981

<sup>1</sup> Excluding suspense, per contra adjustments etc.

<sup>2</sup> There were seven other part-time associates.

<sup>3</sup> From 1934 to 1943, field staff engaged in projects were not treated as Institute workers.

TWENTYSIXTH ANNUAL REPORT : 1957-58

Table 13.2

NUMBER OF TRAINEES IN DIFFERENT INSTITUTE COURSES FROM 1939 TO 1958  
(YEAR GIVEN AS ACADEMIC YEAR, JUNE-JULY)

Course	1939-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	Total
1. <i>Research and Advanced studies</i>	—	2	3	2	8	9	12	13	12	61
2. <i>One/Two/Three year Professional Statistician's</i>										
2.1. First year	100	12	13	16	13	16	30	33	28	261
2.2. Second year	7	9	8	17	17	16	18	20	32	144
2.3. Third year	—	—	—	—	—	—	—	18	25	43
3. <i>I.S.E.C.</i>										
First six months	—	—	36	37	25	27	11	28	18	294
Second six months	—	18	40	30	24					
4. <i>Officer's Training</i>	—	—	—	—	—	—	18	25	19	62
5. <i>Short-term Statistician's</i>										
5.1. <i>Junior</i>										
First six months	—	—	—	—	—	—	55	52	53	160
Second six months	—	—	—	—	—	—	32	53	49	134
5.2. <i>Senior</i>										
First six months	—	—	—	—	—	—	—	—	12	12
Second six months	—	—	—	—	—	—	—	12	8	20
5.3. <i>Evening Course in New Delhi</i> (started in March 1958)	—	—	—	—	—	—	—	—	40	40
6. <i>Officers on deputation</i>	14	3	5	13	8	8	6	6	1	64
7. <i>Computer's Training</i>										
7.1. <i>Junior</i>										
First six months	—	—	—	31	24	32	30	42	45	204
Second six months	—	—	31	30	25	35	30	45	39	235
7.2. <i>Senior</i>										
First six months	—	—	—	—	13	15	17	12	19	76
Second six months	—	—	—	—	16	16	16	19	20	87
8. <i>Other Special Courses</i>	—	—	—	—	—	—	—	82	37	119
<b>Total</b>	<b>121</b>	<b>44</b>	<b>136</b>	<b>176</b>	<b>173</b>	<b>174</b>	<b>275</b>	<b>460</b>	<b>457</b>	<b>2016</b>

# INDIAN STATISTICAL INSTITUTE

**Table 13.3**

NUMBER OF PAPERS PUBLISHED AND REPORTS SUBMITTED BY INDIAN STATISTICAL INSTITUTE WORKERS, CLASSIFIED BY SUBJECT, FROM 1922 TO 1957

Subject	1922- 31	1932- 34	1935- 37	1938- 40	1941- 43	1944- 46	1947- 49	1950- 52	1953- 55	1956- 57	Total
1. Philosophy and History of Statistics	—	—	2	—	—	—	1	4	1	3	11
2. Probability Theory	—	—	—	—	—	3	1	3	9	8	24
3. Descriptive Statistics	—	6	—	5	2	3	—	2	2	2	22
4. Sampling distributions	—	5	13	8	8	3	6	8	1	1	53
5. Estimation	—	—	1	1	4	7	3	10	13	8	47
6. Tests of hypotheses	—	2	—	1	—	4	4	5	6	3	25
7. Multivariate Analysis	1	—	5	8	4	6	10	4	8	2	48
8. Design and Analysis of Experiments	1	15	10	24	28	17	8	2	—	7	112
9. Sample Surveys (Theory)	—	—	—	4	14	5	1	13	15	10	62
10. Reports on Surveys	—	—	2	14	13	3	4	8	6	1	51
11. Economic Studies	10	10	10	1	11	5	7	17	6	2	79
12. Time Series	2	—	—	1	2	1	—	6	2	—	14
13. Vital Statistics and Demography	1	2	2	—	2	2	2	5	1	3	20
14. Anthropology	6	2	1	3	1	—	1	2	1	1	18
15. Metereology, Rivers, Floods and Irrigation	8	—	1	5	—	—	—	1	—	—	15
16. Education and Psychology	—	5	1	1	—	—	2	—	1	3	13
17. Statistical Quality Control	—	—	—	—	—	1	1	1	3	3	9
18. Biometry and Genetics	—	—	—	—	—	—	—	1	—	10	11
19. Mechanical Computation techniques and Punched Card Methods	—	—	—	—	—	—	—	2	2	2	6
20. Miscellaneous Applications of Statistical Methods	1	—	1	—	3	—	3	1	1	—	10
21. Pure Mathematics	—	—	—	—	—	7	—	—	—	—	7
22. Statistical and Mathematical Tables	—	4	1	1	—	—	—	—	1	2	9
<b>Total</b>	<b>30</b>	<b>51</b>	<b>50</b>	<b>77</b>	<b>92</b>	<b>67</b>	<b>54</b>	<b>95</b>	<b>79</b>	<b>71</b>	<b>666</b>

In this table about 60 papers have been counted twice and sometimes thrice depending on the content, the actual numbers of papers being 581.

TWENTYSIXTH ANNUAL REPORT : 1957-58

Table 13.4

SUMMARY OF RESULTS IN EXTERNAL EXAMINATIONS FOR ALL PAPERS, FROM  
1951 TO 1958  
A. STATISTICIAN'S DIPLOMA EXAMINATION

Paper	Year							Total		
	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58			
General Papers	I	R	42	59	65	69	62	133	67	497
		A	24	37	43	45	42	72	61	324
		P	6	9	4	8	18	29	20	94
		%	25	24	9	18	43	40	33	29
	II	R	36	47	50	46	41	82	57	359
		A	18	27	33	28	21	39	50	216
		P	7	9	17	10	9	21	18	91
		%	39	33	52	36	43	54	36	42
	III	R	31	42	45	44	42	77	40	321
		A	16	22	29	28	25	43	22	185
		P	6	9	10	11	4	11	15	66
		%	38	41	34	39	16	26	68	36
VI	R	22	22	37	34	23	42	56	236	
	A	15	19	32	31	19	37	51	204	
	P	3	1	5	15	2	12	18	56	
	%	20	5	16	48	11	32	35	27	
VII	R	22	22	34	31	24	41	52	226	
	A	15	19	29	27	20	38	47	195	
	P	3	4	4	4	4	6	11	36	
	%	20	21	14	15	20	16	23	18	
Special Papers	IV	R	19	13	23	23	27	66	64	235
		A	14	9	20	20	22	41	56	182
		P	13	4	17	14	7	19	32	106
		%	93	44	85	70	32	46	57	58
	V	R	19	12	23	19	27	37	45	182
		A	14	8	18	14	22	23	41	140
		P	12	2	9	7	15	14	24	83
		%	86	25	50	50	68	61	59	59
	VIII	R	13	9	13	14	23	37	48	157
		A	10	8	13	13	21	29	39	133
		P	4	4	2	3	7	9	14	43
		%	40	50	15	23	33	31	36	32
IX	R	13	3	16	20	23	33	39	147	
	A	10	3	15	17	20	31	34	130	
	P	3	2	6	6	9	12	3	41	
	%	30	67	40	35	45	39	9	32	
All Papers	R	217	229	306	300	292	548	468	2360	
	A	136	152	232	223	212	353	401	1709	
	P	57	44	74	78	75	133	155	616	
	%	42	29	32	35	35	38	39	36	

Note : (a) R = number registered; A = number appeared; P = number passed and % = percentage of pass.

(b) Since 1956-57 the examination is held twice in the year.

# INDIAN STATISTICAL INSTITUTE

## B. COMPUTER'S CERTIFICATE EXAMINATION

Paper	Year							Total	
	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58		
IA(I)	R	123	59	67	37	144	234	129	793
	A	93	54	60	34	124	205	120	690
	P	48	19	31	16	88	105	84	391
	%	52	35	52	47	71	51	70	57
IA(II)	R	131	76	78	51	162	320	203	1021
	A	98	68	67	48	136	280	194	891
	P	28	26	10	11	38	71	48	232
	%	29	38	15	23	28	25	25	26
1B(I)	R	87	68	79	52	132	243	168	829
	A	67	57	65	49	108	215	162	723
	P	4	4	9	2	27	22	54	122
	%	6	7	14	4	25	10	33	17
1B(II)	R	88	63	72	47	130	275	144	819
	A	61	52	60	43	99	233	136	684
	P	12	9	7	0	9	60	14	111
	%	20	17	12	0	9	26	10	16
1C(I)	R	44	34	31	19	43	135	87	393
	A	34	33	28	12	34	123	85	349
	P	6	3	5	2	1	39	22	78
	%	18	9	18	16	3	32	26	22
1C(II)	R	32	30	26	20	37	95	69	309
	A	23	29	22	14	29	87	66	270
	P	4	6	6	10	16	47	19	108
	%	17	21	27	71	55	54	29	40
All Papers	R	505	330	353	226	648	1302	800	4164
	A	376	293	302	200	530	1143	763	3607
	P	102	67	68	41	179	344	241	1042
	%	27	23	23	20	34	30	32	29

Note : (a) R = number registered; A = number appeared; P = number passed and % = percentage of pass (approx.).

(b) Since 1956-57 the examination is held twice in the year.

TWENTYSIXTH ANNUAL REPORT : 1957-58

C. STATISTICAL FIELD SURVEY CERTIFICATE EXAMINATION :  
JUNIOR AND SENIOR

Paper	Year							Total		
	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58			
Junior	1A	R	323	10	9	37	98	72	18	567
		A	210	7	6	32	58	54	17	384
		P	88	1	4	9	22	31	6	161
		%	42	14	67	38	38	57	35	42
	1B	R	323	18	10	36	98	86	22	593
		A	206	13	7	32	55	64	20	397
		P	44	4	5	15	18	36	9	131
		%	21	31	71	47	33	56	45	33
	1C	R	159	13	8	30	92	79	20	401
		A	85	9	5	21	50	58	16	244
		P	24	3	4	9	10	36	9	95
		%	28	33	80	43	20	62	56	39
Senior	2A	R	29	1	10	25	92	123	25	305
		A	17	1	9	19	66	88	24	224
		P	4	0	4	10	23	32	13	86
		%	24	0	44	53	35	36	54	38
	2B	R	28	3	12	29	92	131	36	331
		A	17	3	11	24	67	99	30	251
		P	0	0	5	14	13	18	2	52
		%	0	0	45	58	19	18	7	21
All Papers	R	862	45	49	157	472	491	121	2197	
	A	535	33	38	128	296	363	107	1500	
	P	160	8	22	57	86	153	39	525	
	%	30	24	58	45	29	42	36	35	

Note : (a) R = number registered; A = number appeared; P = number passed and % = percentage of pass.

(b) During 1954-55, 1956-57 and 1957-58 the examinations were held twice in the year.

INDIAN STATISTICAL INSTITUTE

Table 13.5

POSITION OF REPORTS OF NATIONAL SAMPLE SURVEY AS ON 8 DECEMBER 1958

Already published

-57-58

ser. no. printed reports no.	title
1. 1.	General Report No. 1 : First Round (October 1950—March 1951). <i>December 1952.</i>
2. 2.	Tables with note on the 2nd Round (April—June 1951). <i>December 1953.</i>
3. 3.	Tables with note on the 3rd Round (August—September 1951). <i>January 1954.</i>
4. 4.	Special Report on the survey of persons in the live register of the Delhi Employment Exchange (August—September 1953, <i>ad hoc</i> ). <i>March 1954.</i>
5. 5.	Technical paper on some aspects of the development of the Sample Design. <i>March 1954.</i>
6. 6.	Survey of Faridabad Township (March—April 1954, <i>Ad hoc</i> ). <i>December 1954.</i>
7. 7.	Couple Fertility : 2nd Round (April—June 1951) and 4th Round (April—June 1952). <i>December 1953.</i>
8. 8.	Report on preliminary Survey of Urban Unemployment (September 1953 <i>Ad hoc</i> ). <i>March 1956.</i>
9. 9.	Report on the Sample Survey of Displaced Persons in the urban areas of the Bombay State (July—September 1953, <i>Ad hoc</i> ). [for Ministry of Rehabilitation : February 1954]. <i>October 1957.</i>
10. 10.	First Report on Landholdings ; 8th Round (July 1954—March 1955). [Main results sent to Government in September 1955, Report in February 1956]. <i>February 1958.</i>
11.	Notes on Investigator Time Record (July 1954—1955) [Cyclostyled report not printed under Government instruction].
12. 11.	Report on the Sample Survey of Manufacturing Industries 1949 and 1950. <i>September 1958.</i>
13. 12.	A Technical Note on Age Grouping. <i>November 1958.</i>
14. 12.	Report on Sample Survey of Manufacturing Industries (1st Round : 1951). [Submitted to Government : <i>December 1955</i> ].
15. 14.	Some characteristics of the Economically Active Population : 4th Round to 7th Round (April 1952—March 1954). [Submitted to Government : <i>October 1956</i> ].
<i>In the Press</i>	
14. 12.	Report on Sample Survey of Manufacturing Industries (1st Round : 1951). [Submitted to Government : <i>December 1955</i> ].
15. 14.	Some characteristics of the Economically Active Population : 4th round to 7th round (April 1952—March 1954). [Submitted to Government : <i>October 1956</i> ]
16. 17.	Small scale transport operation—Household Enterprise : 7th Round (April 1952—March 1954). [Submitted to Government : <i>December 1956</i> ]
17. 28.	Calcutta Employment Survey (September 1953, <i>ad hoc</i> ). [Main results supplied to Planning Commission in October 1955. [Submitted to Government : <i>September 1957</i> ].
18. 19.	Pattern of Consumer Expenditure : 2nd Round to 7th Round (April 1951—March 1954). [Revised Draft submitted to Government : <i>January 1957</i> ].
19. 13.	Consumer Expenditure Tables with notes on the 4th Round (April—September 1952). [Revised Draft submitted to Government : <i>October 1956</i> ].

srl. no.  
printed  
reports no.

title

10. 15. Report on Sample Survey of Employment and Unemployment, Sub-samples 1 and 2 only : 9th Round (May—November 1955). [Submitted to Government : December 1956].
11. 24. Report on Sample Survey of Manufacturing Industries : (SSMI 2nd Round (1952). [Submitted to Government : July 1958].
12. 29. Report on Sample Survey of Manufacturing Industries : SSMI 3rd Round (1953). [Submitted to Government : August 1958].

*Submitted to Government for Clearance*

23. 20. Report on Small-scale Manufacture (Household Enterprise ; smaller than registered factories : 7th Round (October—March 1954). [23 June 1958].
24. 21. Household Small-Scale Manufacturing Establishments (smaller than those covered by Industries Development and Regulation Act 1951) : 9th Round (May—November 1955). [8 July 1958].
25. 23. Note on some results of Land Utilisation Survey : 10th Round (December 1955—May 1956). 8 July 1958].
26. 25. Some aspects of cost of cultivation of Paddy, Wheat, Joar 1952-53 : 5th to 7th Round (November 1952—March 1954). [11 July 1958].
27. 26. Sample Design, Instruction to Field Workers and list of sample localities : 9th Round (May—November 1955). [12 July 1958].
28. 27. Some aspects of cost of cultivation of Barley, Maize, etc : 5th to 7th Round (November 1952—March 1954) [22 July 1958].
29. 18. Sample Verification of Live-stock Census 1956 (June—July 1956, *ad hoc*). [9 January 1957, 10 June 1958 (revised)].
30. 30. Some aspects of Land-holdings in Rural India (Schedule 6) : 8th Round (July 1954—April 1955). [3 September 1958].
31. 31. Tables with notes on Wages, Employment, Income and Indebtedness of Agricultural Labour Households : 11th and 12 Rounds (August 1956—August 1957). [27 September 1958].
32. 32. Tables with notes on Consumer expenditure of Agricultural Labour Households : 11th and 12 Rounds (August 1956—August 1957), [4 October 1958].
33. 33. Report on Land holdings (3) : Some aspects of ownership holdings : 8th Round (July 1954—April 1955). [15 October 1958].
34. 34. A preliminary report on housing conditions : 7th Round (October 1953—March 1954). [8 December 1958].

# INDIAN STATISTICAL INSTITUTE

**Table 13.6**

MEMORANDA, TABLES ETC. SUPPLIED BY INSTITUTE AT THE REQUEST OF  
DIFFERENT AUTHORITIES MAINLY ON THE BASIS OF DATA  
COLLECTED IN NATIONAL SAMPLE SURVEY

srl. no.	subjects of information	submitted to	date
1	On Habits and Preferences in the Reading of Newspapers	Press Commission	October 1953
2	On Cash purchase and Consumption Pattern	Taxation Enquiry	January 1954
3	On Advance Estimates of Crop Production	Ministry of Food and Agriculture	January 1954
4	On Refugee Rehabilitation Work (in Bombay)	Ministry of Rehabilitation	February 1954
5	On Saver's Preferences	Ministry of Finance	December 1954
6	On the Manufacture of Footwear	Ministry of Commerce and Industry	August 1955
7	On Materials regarding Wholesale and Retail Trade Margins, Professions and Liberal Art, etc.	National Income Unit	1953
8	On Employment	Planning Commission	January 1956
9	On Land-holdings	Planning Commission	February 1956
10	On Housing Conditions	Planning Commission	March 1956
11	On Consumption Pattern	Ministry of Labour	July 1956
12	On Estimates of Total and per capita Expenditure on Consumption of 19 different items	Hindusthan Lever Ltd.	July 1956
13	On Estimates of Consumption of Cloth, Household Size, Total Consumer Expenditure, Average no. of Children born per couple, Average age at marriage of husband and wife	Ministry of Community Development	May 1957
14	On Estimates of Consumption of Firewood and Charcoal	Ministry of Agriculture	July 1957
15	On Estimates of Total and per capita Expenditure on Consumption of 29 different items	Hindusthan Lever Ltd.	July 1957
16	On Consumer Behaviour and Price Trends	Foodgrains Enquiry Committee	September 1957
17	On Estimates of Requirements of Metric Weights	Standing Committee on Metric Weights and Measures, Ministry of Commerce and Industry	October 1957
18	On Estimates of Consumer Expenditure on some Selected items for Urban Areas	Ministry of Commerce and Industry	October and November 1957
19	Distribution of population by employment character- istics in CD/CP/NES villages falling in the NSS sample	Ministry of Community Development	November 1957
20	On Land-holdings	Ministry of Agriculture	April 1958

Table 13.7

WORKING PAPER'S PREPARED BY THE INSTITUTE IN CONNECTION WITH PLANNING FOR NATIONAL DEVELOPMENT IN WHICH NSS DATA WERE USED

working paper no.	title of paper	date of release
7	A preliminary study of inter-industry relations if India	16 December 1954
8	Preliminary estimates of relative increase in consumer demand in rural and urban India	18 December 1954
17	Transactions matrices for the Indian Union 1950-51	21 January 1955
19	A note on the concentration of production and labour in some selected industries and its consequences	22 January 1955
24	The concepts of employment and unemployment in India and their measurement	16 February 1955
25	On a method of grouping industries by a similarity of outlay structures	26 February 1955
27	Consumption patterns in different occupation groups	1 March 1955
29	Labour force form Census data	5 March 1955
44	Productive capacity of large-scale industries in India	16 August 1955
57	Monopolies and concentration of economic power—Part	24 April 1956
59	Rates of utilisation in selected manufacturing industries	18 June 1956
80	Annual Plan for 1957-58 : A Draft Outline	9 August 1956
82	A graphical exercise in the use of consumption patterns	17 August 1956
85	Some results in consumption studies	7 September 1956
90	Increased food production and its effects on the Transportation system.	20 May 1957
94	The effect of the size of a factory on certain relations between capital, labour, output and earnings	13 November 1957
96	On discrimination of Consumer Patterns	17 December 1957
101	A study of the pattern of consumer expenditure in rural and urban India	13 January 1958
102	Some findings of the try-out on Agricultural Labour Enquiry 1956	1 February 1958
103	Inter-industry Relations of the Indian Economy (1953-54, at market price)	7 February 1958
104	A flow chart of Agricultural Commodities	15 February 1958
110	First notes on Consumption Pattern	4 March 1958
113	Estimation of Contribution to National Income by Plantation : 1953-54	11 March 1958
115	Expenditure Consumption Curves for some selected Consumer items	5 April 1958
117	On the deflation of the National Income in India by the final expenditure approach	21 April 1958
123	Type sutdy of Peak Period in harvesting of Aman Paddy West Bengal, December 1954-January 1955	19 May 1958
127	A note on the Distributive Trades in India	30 June 1958
	*Educated persons in India	May 1958
	*Occupational Pattern in Manufacturing Industries	May 1958

\* Reports prepared by the perspective Planning Division of the Planning Commission in collaboration with the Indian Statistical Institute, using data collected by National Sample Survey and Sample Survey of Manufacturing Industries. Also see Appendix 6.

INDIAN STATISTICAL INSTITUTE

Table 13.8

WORKING PAPERS PREPARED IN CONNEXION WITH PLANNING  
FOR NATIONAL DEVELOPMENT

(Corrected upto 8.12.58)

working paper no.	title of papers	date of release	author
(1)	(2)	(3)	(4)
1	Note on studies relating to planning for national development now being conducted at the Indian Statistical Institute in collaboration with the Central Statistical Organization.	19 November 1954	P. C. Mahalanobis
2	Scheme of a model of reasoning for the elaboration of the 2nd F.Y.P. of India	19 November 1954	Ch. Bettelheim
3	Planning for economic development in India : A memorandum on the broad macro-economic aspects of the problem	26 November 1954	Ragnar Frisch
4	A study of concentration curves as description of consumption pattern	26 November 1954	J. Roy, I. M. Chakravarti and R. G. Laha.
5	A short memorandum on a technique for elaborating the new F.Y.P. for India	11 December 1954	Ragnar Frisch
6	Note on the economic policy	13 December 1954	Ch. Bettelheim
9	India 1951-2001 Population Projections	23 December 1954	Ajit Dasgupta and M. Mazumdar
10	Investment allocation and increase in national income	24 December 1954	Ch. Bettelheim
11	General remarks on the programming matrix	25 December 1954	Ragnar Frisch
12	Balance relations involved in the Bettelheim model	29 December 1954	A. Rudra
13	A basic instrument in the planning work—The technical description sheet	29 December 1954	Ragnar Frisch
14	Investment, consumption and employment under a balanced expansion	16 January 1955	Ragnar Frisch
15	The programming chart with a preliminary draft of a nomenclature of production sectors	20 January 1955	Ragnar Frisch
16	Observations on the social conditions necessary for a rapid and planned economic development	21 January 1955	Ch. Bettelheim
18	Scientific principles of planning the national economy of the USSR	22 January 1955	K. V. Ostrovitianov
20	The methodology of planning in an under-developed country	23 January 1955	Ragnar Frisch
21	Second Plans : Aims and Philosophy	27 January 1955	Dr. V.K.R.V. Rao
22	A sequence of calculations for determining an optimal plan frame by means of linear programming	4 February 1955	Ragnar Frisch
23	Some preliminary results on experimental plan frame no. 1	15 February 1955	Ragnar Frisch

TWENTYSIXTH ANNUAL REPORT : 1957-58

working paper no.	title of papers	date of release	author
(1)	(2)	(4)	(5)
26	The compact form of the Gaussian algorithm for solving linear equations and inverting matrices in the general case where the original matrix need not be symmetrical	26 February 1955	Ragnar Frisch
28	Some data on the economic development of Poland	4 March 1955	Oskar Lange
30	Some balance of national economy (extracts from A. I. Gozulov, Economic Statistics, Part VII, p. 480-526)	8 March 1955	Compiled by Oskar Lange
31	A plan for land reform (for consolidation of holdings and other purposes)	10 March 1955	N. C. Chakravarti
32	Planning and the problem of aggregation	11 March 1955	A. K. Chakravart & S. S. Sengupta
33	Agrarian reform in Poland	11 March 1955	Oskar Lange
34	Experimental plan frame no. 1 structure of the set up and numerical results	12 March 1955	Ragnar Frisch
35	The history of the electrification plan of the Soviet Russia	12 May 1955	M. I. Rubinstein
36	Balance method in the Soviet Socio-economic statistics	18 May 1955	I. Y. Pisarev
37	Some problems concerning economic planning in under-developed countries	21 May 1955	Oskar Lange
38	Fundamentals of economic planning	21 May 1955	Oskar Lange
39	Basic problems of the statistics of the national income in the USSR	23 May 1955	P. M. Moskvin
40	Statistics and planning	16 June 1955	I. Y. Pisarev
41	Balance of the national economy	23 June 1955	P. M. Moskvin
42	The most important categories, concepts, definitions of Soviet State Statistics of population and industry, based on Dictionary-Reference Book of Social Economic Statistics of the Central Statistical Department	28 June 1955	I. Y. Pisarev
43	Technical co-efficients (consumption units physical) France 1949	30 June 1955	F. Divisia
45	A note on the ratio of increment of national income to investment	31 August 1955	M. Mukherjee and Uma Dutta
46	Value of material production in India : 1948-49.	10 September 1955	M. Mukherjee
47	On the shift of employment from capital intensive production processes	20 September 1955	M. Mukherjee
48	A study in maximalization of employment	30 September 1955	S. S. Sengupta and D. K. Bose

# INDIAN STATISTICAL INSTITUTE

working paper no.	title of papers	date of release	author
(1)	(2)	(3)	(4)
49	An attempt at estimating parameters of a simple model of economic growth	1 November 1955	M. Mukherjee and Uma Dutta
50	Foreign trade and planning for national economic development	24 January 1956	Ch. Bettelheim
51	A scheme of calculations for an Annual Plan	30 January 1956	A. Rudra
52	Planned economic growth and foreign trade	1 February 1956	Ch. Bettelheim
53	Financing the 2nd Five-Year Plan	7 February 1956	P. K. Gopalkrishna
54	The concept of the economic surplus	28 February 1956	P. A. Barann
55	Introduction to a study of industrial non-industrial and financial groupings in India (Calcutta region)	29 February 1956	A. V. Narsu
56	Some observations on input-output analysis	23 March 1956	Oskar Lange
58	Measurement of the density of Railway Passenger Traffic	28 May 1956	P. K. Upadhyaya
60	A note on the utility of Cobb-Douglas type of production function for Indian Manufacturing Industries	22 June 1956	G. V. L. Narasimham
61	Indian Labour during First Five-Year Plan	2 July 1956	Ajit Roy
62	The technological choices and the aim of economic planning (long term planning paper no. 1)	9 July 1956	Ch. Bettelheim
63	Shipping and foreign exchange	12 July 1956	N. K. Chatterjee
64	Relation between investment and production of cement and steel in some selected countries	14 July 1956	I. R. K. Sarma
65	Non-essential imports and foreign exchange	15 July 1956	N. K. Chatterjee
66	A note on forecasting net product of 1953-54	17 July 1956	S. S. Sengupta; A. K. Chakravarti and V. K. Agarwal
67	A model for periodical planning	20 July 1956	S. S. Sengupta
68	Basic data needed for solving the problems of investment allocation and of technological choice (long-term planning paper no. 2)	21 July 1956	Ch. Bettelheim
69	The allocation of investment (long-term planning paper no. 3)	23 July 1956	Ch. Bettelheim
70	The problem of technological choices (long-term planning paper no. 4)	26 July 1956	Ch. Bettelheim
71	Employment problems and economic growth (long-term planning paper no. 5)	27 July 1956	Ch. Bettelheim
72	Modernization and Rationlization investments (long-term planning paper no. 6)	28 July 1956	Ch. Bettelheim
73	Some basic long-term planning problems—general conclusions (long-term planning paper no. 7)	30 July 1956	Ch. Bettelheim

TWENTYSIXTH ANNUAL REPORT : 1957-58

	title of papers	date of release	author
(1)	(2)	(3)	(4)
74	The problems of the elaboration of the provisional project of a (long-term planning paper no. 8) long-term plan of India.	31 July 1958	K. A. Naqvi
75	The methodology of the elaboration of the provisional project of a long-term plan of India (long-term planning paper no. 9)	1 August 1956	K. A. Naqvi
76	The problems in the choice of techniques during the fifteen year plan (1956-57—1970-71) of India (long-term planning paper no. 10)	2 August 1956	K. A. Naqvi
77	On factors of production of coal	4 August 1956	A. K. Chakravarti
78	Estimates of material production in India from 1949-50 to 1952-53	4 August 1956	G. V. L. Narasimham
79	Relation between national income and production of some selected industries	6 August 1956	L. R. K. Sarma
81	Commodity balances for the basic raw material (Indian industries 1951-55)	10 August 1956	T. R. Talwar
83	Agricultural forecasts for 1955-56 to 1960-61	24 August 1956	P. R. Rao
84	Unutilised capacity, imports and foreign exchange	27 August 1956	N. K. Chatterjee
86	Size efficiency in Manufacturing industry	19 September 1956	A. V. Narsu
87	An approach to the problem of investment in Railways and Road Transport during the Second Five-Year Plan	9 November 1956	M. N. Ghosh
88	Trends in Labour Productivity and Wages in twelve selected industries (1946-1952)	4 December 1956	A. K. Chatterjee
89	Progress of the industrial sector (organised) during the First Five-Year Plan : an assessment	7 January 1957	P. Das
90	Statistical evidence on acceleration principle in Indian Railways during 1919-52	7 November 1957	N. V. A. Narasimham
91	National income of India in 1956-57 : A tentative estimate	1 October 1957	E. A. Unit of the Planning Dvn.
93	Supply function of India's export and marginal wage and raw material quotas during 1919-1952	7 November 1957	N. V. A. Narasimham
95	A note on the estimation of future need of technical manpower in India	17 December 1957	A. Mukherjee
97	Data on National Income, Consumption and Accumulation relating to the People's Republic of China for the period covered by the First Five Year Plan	17 December 1957	E. A. Unit of the Planning Dvn.
98	Aspects of planning in the United States Economy	9 January 1958	Leon H. Keyserling
99	Aspects of planning in the Indian Economy	10 January 1958	Leon H. Keyserling
100	Input-output analysis and general equilibrium	11 January 1958	A. K. Biswas

INDIAN STATISTICAL INSTITUTE

working paper no.	title of papers	date of release	author
(1)	(2)	(3)	(4)
105	A Note on consumption	18 February 1958	S. M. Kansal and M. Bhattacharya
106	On an application of inter-industrial relations, (1951-52)	24 February 1958	S. Sankar Sen- gupta, Ashish Chakravarti, V. K. Agarwal
107	A list of planning division working papers no. 1 to no. 100	26 February 1958	
108	Balance of national economy—an instrument of long term planning (with a special study showing the elaboration of a branch plan-energy sector).	28 February 1958	Johannes Rudolph
109	On the system of training of statistical personnel in the USSR	3 March 1958	A. I. Ezhov
111	On some simple illustrative dynamic inter-industry models	6 March 1958	A. K. Chakravarti and S. Sengupta
112	Some problems of planning the development of the national economy in the German Democratic Republic	8 March 1958	Johannes Rudolph
114	Planning in Yugoslavia	19 March 1958	Albin Orthobar
116	A long term Planning Model for India	17 April 1958	J. Sandee
118	An Estimate of Stock of Precious metal	21 April 1958	V. Prakash
119	On the appropriateness of the price average to be used for obtaining the value of output in agriculture	25 April 1958	M. Mukherjee
120	A demonstration Planning Model for India	29 April 1958	J. Sandee
121	Inter-Industry Transactions and National Income	7 May 1958	A. Biswas
122	Economic data collected by NSS	12 May 1948	J. Sandee
124	Planning and Economic Laws	20 May 1958	J. Rudolph
125	Annual Report of the Planning Division : 1957-58	2 June 1958	
126	The Place of the Private Sector in the Indian Economy	27 June 1958	Henry Smith
128	Private Industry in Indian Economic Development	1 July 1958	Henry Smith
129	On some aspects of cost of production in Kalyanashree	12 August 1958	P. N. Chowdhury
130	A study of Industrial Groups for the years 1946-53 on the basis of C.I.M. (Census of Indian Manufacturers) data	18 August 1958	A. V. Narsu
134	Industrial Growth and Railway Freight Transportation Behaviour	6 September 1958	Tapan Piplai
135	Note on village and small industries in India—Analysis of the cause of decline and suggestions for reorganisation	9 September 1958	Kali Charan Ghosh
136	A starting point for long range planning in India	15 September 1958	Planning Unit (N. K. Chatterjee, S. Naqvi, A. V. Narsu, M. Ahmad, T. Piplai) in colla- boration with J. Rudolph
137	A note on the relation between Harvest period and annual average prices	16 September 1958	B. Roy
139	Role of imports in the economy (Estimation of techno- logical import requirements)	2 October 1958	Ashish Kumar Chakravarti
140	On the level of wages during Akbar's rule	7 October 1958	Mahfooz Ahmed
141	A note on employment and hours at work in selected services and occupations from NSS data	27 October 1958	Anil Chatterjee
142	Studies on the economics of livestock industry in Indian agriculture	21 November 1958	I. Chatterjee
143	A note on production and utilisation of coal and costs of coal mining (1954-55)	4 December 1958	A. K. Sanyal