

THE INDIAN STATISTICAL INSTITUTE

ANNUAL REPORT FOR 1934-35.

The Indian Statistical Institute has completed the third year of its life. Progress must necessarily be slow in India where the study of statistics on scientific lines is in its infancy. During the year under review the Institute has however succeeded in winning recognition from both Government and the general public in various ways.

RESEARCH GRANT FROM THE GOVERNMENT OF INDIA.

The Hon. Secretary took advantage of his visit to Simla in September 1934 to see a number of high officials and members of the Government of India in connexion with the work of the Institute. His representations were received with sympathy by the Hon'ble Sir James Grigg, K.C.B. (Finance Member), Mr. G. S. Bajpai, I.C.S. (Secretary, Department of Education, Health & Lands), and Sir George Anderson, Kt. C.S.I., C.I.F. (Educational Commissioner with the Government of India). Sir George Anderson visited the laboratory on the 4th October, 1934, and a little later, on the 26th December, the Hon'ble Sir James Grigg came to the laboratory and looked with great interest into the details of the work being done there.

At a meeting of the Council of the Institute held on the 4th October, 1934 it was decided to submit an application to the Government of India for a research grant. It was pointed out in this letter that the subject of statistics was of great practical importance to India. This was especially true of recent developments in the methods of analytic statistics and their applications in agriculture, industry, education, flood and irrigation studies, medicine and public health, demography, anthropometry, biometry and other experimental sciences. Unfortunately no provision for higher studies and researches in statistics had been made so far in any university or institution in India.

The distinction between recent developments of analytic statistics on one hand, and the studies connected with the statistics of trade and commerce and economics on the other was also emphasized. Facilities for research in the latter subject exist in certain Indian Universities and also in the Department of Commercial Intelligence and Statistics; such facilities do not and cannot however in any way meet the need of advanced studies in analytic statistics.

As a result of these representations the Government of India have sanctioned a research grant of Rs. 5,000/- a year for 3 years with effect from 1935-36. The Hon. Secretary discussed the details of the scheme with Sir George Anderson in Delhi on the 4th April last and it was informally agreed that the grant would be utilized primarily for research purposes, subjects for study in order of preference being (i) mathematical and theoretical statistics, (ii) educational tests, (iii) biometric studies including medical statistics and public health, and (iv) statistics relating to economic studies and other subjects. It was also proposed to set up a Standing Committee for Research.*

* A Standing Committee for Research was appointed by a resolution passed at the Annual Meeting of the Institute held on the 26th April, 1935.

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APPLICATION OF THE STATISTICAL METHOD IN INDUSTRY.

The Secretary saw the Hon'ble Sir Frank Noyce (Member, Department of Industries and Labour) in Simla on the 10th September, 1934 and made representations regarding the need of introducing the statistical method in industrial research. A long note on this subject was submitted to the Government of India on the 26th October, 1934. The Hon'ble Sir Frank Noyce visited the laboratory on the 4th January, 1935, and the Government of India have been pleased to accept on principle the need of exploring the possibilities of the new method at the earliest opportunity.

EXAMINATIONS IN STATISTICS.

The question of instituting examinations in statistics had been discussed informally as early as April 1931 when the proposal to start the Indian Statistical Institute was under consideration. The general opinion was in favour of undertaking this work at an early date, and the first clause in Section 3 of the Memorandum of Association empowers the Institute "to grant certificates of proficiency in statistics."

During the last three or four years there has been a slow but steady growth in the demand for trained computers and statisticians. In the present unorganised condition of statistical studies in India, it is of great importance to set up objective and authoritative standards of proficiency in statistics at the earliest opportunity.

The present situation was carefully considered by the Council of the Institute, and it was unanimously recommended that a Committee should be appointed to report on the action to be taken for instituting examinations for the award of certificates or diplomas in statistics.¹

COMMITTEE FOR OFFICIAL STATISTICAL PUBLICATIONS.

The need of a careful scrutiny of the form and content of official statistical publications has been felt for a long time. Dr. H. Sinha, the Joint Hon'y. Secretary, has been studying this question carefully for some time, and steps have been already taken to set up a committee² for this purpose with Dr. Sinha as Secretary. The Hon'y. Secretary discussed this question during his visit to Poona and Bombay at meetings of the Local Branches and has been assured that active co-operation from these centres would be forthcoming. Dr. J. Matthal, the Director-General of Commercial Intelligence and Statistics, has also promised to help in this work in every way.

WORK IN CALCUTTA: MEETINGS OF THE INSTITUTE.

By the kind permission of Mr. B. M. Sen, Principal, Presidency College, meetings of the Institute were held in the Presidency College, Calcutta. A list of the meetings with short summaries is given below.

Saturday, July 7, 1934. H. C. Sinha: *Organisation of Statistical Studies in Europe.* Described his own experiences regarding activities at statistical centres in England, France, Italy and Germany. Different methods of collecting primary statistics, com-

¹ This recommendation of the Council was adopted, and an Examinations Committee was appointed by a resolution passed at the Annual Meeting held on the 26th April, 1935.

² A Committee for Official Statistical Publications was appointed by a resolution passed at the Annual Meeting held on the 26th April, 1935.

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pilation of data, and statistical controls were discussed. Standard forms of entry for primary statistics were exhibited in the meeting, and suggestions for improving statistical compilations in India were made. In conclusion the lecturer referred to the kindness shown by the statistical officers in the United Kingdom and the Continent in the matter of giving him facilities for study and in presenting to the Indian Statistical Institute various official printed forms for the collection of primary statistics as well as bibliographic literature for research work.

Saturday, July 14, 1934. P. C. Mahalanobis: *Fundamental Concepts in the Theory of Sampling in Statistics.* The concepts of populations and samples, finite and infinite populations. Repetition of random samples under exactly similar conditions. Distribution of sample values. Efficient and inefficient estimates of statistical parameters.

Saturday, July 21, 1934. K. N. Chakraverty: *Statistical Analysis of Examination Marks.* The lecturer gave a detailed discussion regarding the statistical analysis of examination marks of U. P. Schools recently carried out in the laboratory in conjunction with P. C. Mahalanobis. The marks are more or less symmetrically distributed, and could be described with sufficient accuracy by a normal curve. The correlation was highest between Mathematics and History-Geography, and practically negligible between Vernacular and Mathematics as well as between Vernacular and History-Geography. P. C. Mahalanobis pointed out that the correlations did not satisfy Spearman's tetrad test, and discussed the significance of this failure.

Saturday, July 28, 1934. Raj Chandra Bose: *The Criteria that Two Given Samples are Drawn from a Given Normal Population.* An exposition, after Neyman and Pearson, of the tests of identity of two samples by the use of Fisher's principle of maximum likelihood.

Saturday, August 4, 1934. Brojo Mohan Chatterjee: *The Principles of Harmonic Analysis.* The Fourier series and its convergence. Details of calculation of the coefficients. The principle of least square and its bearing on Fourier terms. Application of Harmonic Analysis in economic series, meteorological and epidemiological data. Advantages of 12-ordinate and 24-ordinate schemes were pointed out with numerical examples.

Saturday, August 11, 1934. Prabhat Ranjan Roy: *Interpolation.* General problem of interpolation and methods of deriving various types of formulae with equal and unequal intervals. Comparison of different types. Methods of inverse interpolation were shown in detail, and the accuracy of various formulae was discussed. P. C. Mahalanobis pointed out that the usual assumption in interpolation was that observed values were exact like values of mathematical functions for different values of the arguments. If it is conceded that observed values were statistical estimates, it would follow that there were limits determined by the standard error of the estimates beyond which the accuracy of interpolation could not proceed.

Thursday, August 23, 1934. Raj Chandra Bose: *The Problem of Two Samples.* A continuation of the speaker's discourse on the identity of two samples. Neyman and Pearson's test of significance was discussed in detail from the point of view of the principle of maximum likelihood and was illustrated by examples.

Saturday, September 1, 1934. Brojo Mohan Chatterjee: *On the Principles of Harmonic Analysis.* In continuation of the previous discourse he explained the principles underlying the tests developed by Schuster and by Gilbert Walker, and discussed R. A. Fisher's treatment of the subject. Reference was also made to recent work on periodogram analysis.

Saturday, September 29, 1934. Raj Chandra Bose: *The Problem of K-Samples.* Neyman and Pearson's work on K-samples illustrated with actual examples and detailed discussion of the method of using tables and curves of probability.

RESEARCH FELLOWSHIP.

Mr. Raj Chandra Bose, M.A., continued to hold the part-time Research Fellowship of the Institute created by an earmarked donation from Mrs. P. C. Mahalanobis. Mr. Bose completed two papers during the course of the year:—(1) On the Application of Hyper-space Geometry to the Theory of Multiple Correlation (*Sankhyā*, Vol. I, Parts 2 & 3), and (2) On the Exact Distribution of the D^2 -statistics, (*Sankhyā*, Vol. II, Part 2).

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THE STATISTICAL LABORATORY, CALCUTTA.

Although the Statistical Laboratory is not officially a part of the Institute, in actual fact the two are intimately connected, and a short report of the work now being conducted in the laboratory is given below.

Work in the Statistical Laboratory is proceeding under the guidance of P. C. Mahalanobis in a variety of subjects including theoretical researches in mathematical statistics. Subbendu Sekhar Bose continued his studies in agricultural field experiments and animal nutrition, and worked out the exact distribution of R. A. Fisher's Z-statistics for correlated variates; he was also in charge of short courses of training in statistics arranged for officers on deputation. Sadasiv Sen made a statistical study of the height and weight of Bengali women, data for which had been collected by Dr. G. C. Nandi of the Chittaranjan Seva Sadan, Calcutta; and Satyabrata Roy Choudhury worked on Intelligence Tests.

Among the part-time workers, the studies of Raj Chandra Bose (*Asutosh College*) in the theory of statistical distributions have been already mentioned. Khagendra Nath Chakravarti (*Presidency College*) continued his studies in educational statistics. Nirmal Chandra Choudhury (*Department of Commercial Intelligence*) in conjunction with Probodh Chandra Das worked on correlations in pelvic measurements in Bengali women. Hari Charan Ghosh (*Calcutta University*) was engaged in gathering material for an investigation in agricultural economics, and Jhanrajan Guha Thakurta worked on correlation studies in economic data. J. C. Gupta (*Carmichael Medical College*) assisted by J. M. Sen Gupta (*Statistical Laboratory*) started a field survey of blood-pressure among school children in Calcutta. Haris Chandra Sinha (*Calcutta University*) with Brojo Mohan Chatterjee (*Port Commissioners Office*) were engaged in a critical examination of official statistical publications. Jatis Chandra Sen (*City College*) made a detailed comparison of I.Q. and I.M., a standard measure of intelligence based on the normal distribution. Kshitish Chandra Roy studied by statistical methods certain data relating to genuine and adulterated ghee.

Work was also proceeding on bi-variate sampling, reduction of anthropometric data, collection of profile photographs, extension of tables for R. A. Fisher's Z-statistics, theoretical work and sampling experiments on Mahalanobis's D²-statistics, and sampling from non-normal populations.

Sudhir Kumar Banerjee was in charge of the computation work and the general section; he worked out certain auxiliary tables for facilitating statistical calculations. Jaladhar Sarma, Bhuwendra Nath Roy, Jitendra Mohan Sen Gupta, Navigopal Mahalanobis, Sailendra Chandra Das Roy, Haripada Ghosh, and Subodh Chandra Das Gupta worked as computers and general assistants.

Research Grants. The Imperial Council of Agricultural Research has approved of an enlarged scheme of statistical studies relating to agriculture and has sanctioned a non-recurring grant of Rs. 2,500/- and an annual recurring grant of Rs. 7,500/- for five years. Work under the enlarged scheme was started on the 1st December, 1934.

It is gratifying to note that the Government of Bengal also have sanctioned a grant of Rs. 3,500/- for 1935-36 for the Statistical Laboratory for work in connexion with agricultural statistics in Bengal. We are indebted to the Hon'ble Sir John Woodhead, K.C.I.E. (Finance Member, Bengal), and to our Vice-President the Hon'ble Raja Sir Manmatha Nath Ray Chaudhury, Kt. (President, Bengal Legislative Council) for their active interest and help in securing the Government grant.

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Board of Economic Enquiry. The Board of Economic Enquiry which was set up by the Government of Bengal in February 1934 turned over to the Statistical Laboratory for analysis a large amount of data collected by Government during a special enquiry into rural indebtedness conducted by them in 1933-34, and sanctioned Rs. 925/- for this work. The material consisted of records for over 7,000 agricultural families in 30 districts of Bengal. The analysis was conducted under the supervision of Prof. P. C. Mahalanobis, who had been appointed a member of the Board. Only a few selected topics could be covered in the preliminary analysis which was completed during the period May to September 1934. Two reports were submitted to the Economic Board, and have been published by the Government of Bengal in abstract form. The original material however contains much valuable data regarding the economic life of Bengal villages, and it is to be hoped that either the Board of Economic Enquiry or the Government of Bengal will place sufficient funds at our disposal to complete a detailed and thorough analysis. It is a pleasure to acknowledge in this connexion the ungrudging help received from Mr. Sailendra Nath Sen, one of the honorary workers in the Statistical Laboratory.

WORKERS FROM OUTSIDE CALCUTTA.

As in previous years a large number of officers came on deputation from all over India for short courses of training in statistics. A list is given below.

Mr. S. C. Sen Gupta, M.Sc., (*Asst. Second Economic Botanist, Bengal*) April 1934.
Dr. B. B. Mukherjee, M.A., Ph.D., (*Asst. Mycologist, Imperial Institute of Agricultural Research, Pusa*) May 1934. Mr. J. R. Pal, B.Ag., (*Asst. Rice Research Officer, Bankura*) July 1934. Md. Imam Ahmed (*Asst. Director of Agriculture, United Provinces*) August-October 1934. Mr. Abdul Mobin Choudhury (*Asst. to the Agricultural Chemist, Assam*) September-October 1934. Dr. S. P. Ray Chaudhuri, D.Sc., (*University of Calcutta*) September-October 1934. Mr. L. Phukan, B.Ag., (*Agricultural Chemist, Assam*) September 1934. Mr. Ganesh Barua (*Asst. Agricultural Chemist, Assam*) September 1934. Mr. S. C. Ray, B.Sc., (Ag.), (*Asst. Director of Agriculture, United Provinces*) September 1934. Mr. Jyotsna Kumar Bose, M.Sc., (*University of Calcutta*) November-December 1934. Mr. Abdul Hye, M.Sc., (*Animal Nutrition Section, Dacca Farm, Bengal*) November 1934. Mr. Vishnu Sarma, B.Sc., (*Asst. Director of Agriculture, United Provinces*) November 1934. Mr. Hemendra Nath Pal, M.Sc., (*Botanical Assistant, Assam*) November 1934. Mr. S. N. Venkataramanan, B.A., B.Sc., (Ag.), (*Agricultural Officer, Madras*) December 1934-February 1935. Mr. Nakibuzaman Ahmed, B.Sc., (*Rice Expert, Tilaber Farm, Assam*) February 1935. Mr. K. S. S. Iyer, (*Prof. of Agricultural Engineering, Agricultural College, Nagpur*) March-April 1935.

STATISTICAL ENQUIRIES.

As usual a large number of statistical enquiries covering a wide range of topics was received from India and abroad, during the year. Condensed statistics of the distribution of enquiries is given below:—

By Subjects—Agriculture: 125, Anthropometry: 3, Economics: 2, Education: 2, Forest: 4, Geology: 1, Medical: 2, Meteorology: 2, Miscellaneous: 1. Total 127.

By Provinces—Assam 8, Bengal 77, Bihar & Orissa (including Pusa) 16, Bombay 18, Burma 4, Punjab 4, Sind 4, United Provinces 7, Baroda 2, Hyderabad 1, I.C.A.R. 1.

From Abroad—10.

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STATISTICAL LIBRARY.

Our best thanks are due to Dr. C. W. B. Normand, D.Sc., Director General of Observatories, who visited the laboratory on the 15th February 1934, for presenting to the Statistical Laboratory a complete set of all publications of his department available for distribution and required by us, and also for placing our name on the free list for future publications. The Director General of Commercial Intelligence and Statistics has also kindly agreed to supply us with free copies of current publications of his department. We have submitted an official application to the Government of India for free copies of other official publications of statistical interest. Sir George Anderson is helping us actively in this matter, and the Department of Education and several other departments have already agreed to supply us with their publications.

A classified list with a complete card of all periodicals, prepared under the supervision of Dr. H. Sinha, has proved extremely useful for reference. The catalogue of the library could not be completed owing to want of funds, but it is proposed to take this work in hand in the near future. (We are receiving at present over 400 journals and reports from practically all over the world) including Argentine Republic, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czechoslovakia, Denmark, Egypt, Estonia, Finland, France, Germany, Greece, Hungary, Irish Free State, Italy, Japan, Malaya, Netherland, Norway, Panama, Paraguay, Persia, Philippine Island, Poland, Portugal, Roumania, Spain, Africa, Suez, Sweden, Switzerland, Turkey, United Kingdom, United States of America, Uruguay, U. S. S. R. (Russia) and International publications.

VISITORS.

As usual a large number of distinguished persons visited the laboratory last year. Besides members of the Calcutta University and of various other local institutions, the following names may be mentioned in this connexion:—

✓ Sir George Anderson (*Educational Commissioner with the Government of India*). Dr. Krisnadās Bagchi (*Forest Research Institute, Dehradun*). Dr. P. Basu (*Vice-Chancellor, Agra University*). ✓ Prof. S. S. Bhatnagar (*Lahore University*). Mr. B. C. Burt (*Vice-Chairman, I.C.A.R.*). Dr. Santiram Chatterjee (*Secretary, Calcutta Medical Association*). ✓ Mr. A. K. Chanda (*Offg. Director of Public Instruction, Bengal*). Mr. H. R. Cooper (*Chief Chemist, Indian Tea Association*). Dr. and Mrs. Nilratan Dhar (*Allahabad University*). Mr. A. B. Dhruva (*Principal, Hindu University*). Mr. G. E. Fawcus (*Director of Public Instruction, Bihar & Orissa*). Prof. J. C. Ghose (*Dacca University*). Dr. Sudhin N. Ghose (*League of Nations*). ✓ The Hon'ble Sir James Grigg (*Finance Member, Government of India*). Prof. G. S. Ghurrie (*School of Sociology, Bombay University*). Prof. A. B. A. Hallem (*Aligarh Muslim University*). Dr. J. H. Hutton (*Commissioner, Naga Hills*). Dr. L. K. Hyder (*Member, Public Service Commission*). Pandit Amarnath Jha (*Allahabad University*). Dr. N. N. Kaul (*Agra University*). Mr. G. Ahmed Khan (*Collector, Aurangabad*). Mr. R. Littlebailes (*Madras University*). Dr. E. P. Metcalfe (*Vice-Chancellor, Mysore University*). ✓ Mr. Shyama Prasad Mookerjee (*Vice-Chancellor, Calcutta University*). ✓ The Hon'ble Sir Frank Noyce (*Member, Department of Industries and Labour, Government of India*). ✓ Dr. R. P. Paranjpye (*Vice-Chancellor, Lucknow University*). Dr. Mitu Prasad (*Lahore University*). Dr. A. N. Puri (*Irrigation Laboratory, Lahore*). ✓ Sir S. Radhakrishnan (*Vice-Chancellor, Andhra University*). Mr. A. F. Rahman (*Vice-Chancellor, Dacca University*). Dewan Bahadur A. C. Ranganathan (*Vice-Chancellor, Annamalai University*). Rai Bahadur Suret Ch. Roy

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(*Editor, Man in India, Ranchi*). Dr. S. R. Savur (*Meteorologist, Poona*). Mr. F. A. Sechse (*Member, Board of Revenue, Bengal*)/Prof. Meghnad Saha (*Allahabad University*). Prof. A. C. Sengupta (*Principal, Morris College, Nagpur*). Prof. I. B. Sethi (*Government College, Lahore*). Lala Shiram (*Delhi Cloth Mills, Delhi*). Sir T. Vijayaraghavacharya (*Vice-Chairman, I. C. A. R.*). Prof. A. R. Wadia (*Mysore University*). Prof. P. A. Wadia (*Bombay University*). Dr. A. C. Woolner (*Punjab University*).

POONA BRANCH.

Prof. Kale continued to act as Chairman, and Prof. D. G. Karve as the Local Secretary of the Poona Branch. Prof. Karve's report on the working of the Poona branch for 1934-35 is given below.

The year under report witnessed a steady progress in the activities of the Branch. Already nine members of this branch had become life members of the Institute; during the current year Dr. C. W. B. Normand, Director General of Meteorological Observatories in India, became a Life Member. Under the sympathetic and able guidance of Dr. Normand, the Meteorological Department in Poona continues to do considerable work in applied and theoretical statistics. The results of this work are being published in the Memoirs issued by the Department and in the Indian Journal of Statistics. Several other members of the Meteorological Department have joined the Institute, and throughout the year the membership of the Branch continued to be satisfactory. Besides regular members, many persons took part in the activities of the Branch thus widening the circle of interest for the progress of statistical work.

During the earlier part of the year under report the Branch inaugurated a class for the study of statistical method under the guidance of Dr. S. R. Savur of the Meteorological Department. In all six lectures were given, and were attended by a large number of research workers who derived great benefit from the course. It is intended to extend this work further next year.

At two meetings of the Branch important statistical investigations were discussed. At one of these Mr. D. R. Gadgil, Director of the Gokhale School of Economics and Politics, one of the institutions conducted under the auspices of the Servants of India Society, presented the results of an inquiry into the conditions of Motor Transport in the Deccan, which will be shortly published in the form of a special report. Besides the information received from the motor-bus owners themselves in the form of replies to questionnaires, records of local bodies and police authorities were also utilised, and were supplemented by personal enquiries by trained investigators.

In spite of an earlier protest by the Council of the Institute, the Railway authorities again refused to supply any information with regard to the subject matter of the present inquiry. Although the Railway authorities in India are complaining about the alleged unfair competition from road transport, it is discouraging to find that they refuse to supply information for bonafide scientific investigations regarding the subject of their complaint.

On the basis of such materials as was available Mr. Gadgil arrived at the following conclusions: That the one-bus owner predominates; excluding bus services within Municipal limits, buses operating over a route mileage of less than ten are few; 20 miles to 50 miles is the dominant group; the largest number of buses do between 70 and 100 miles a day; more than two-thirds of the buses were purchased for cash payments and less

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than one third on the instalment system; systematic accounts and insurance are rare; excepting in a few sheltered routes, the working, depreciation and insurance charges are not fully met from earnings. In the absence of reliable data for density of traffic and relevant railway statistics more detailed analysis of the economics of Motor Transport was not found to be possible.

At another meeting of the Branch, Prof. Karve presented for discussion a paper on the growth of population in India. Total population, occupational census, birth and death rates, infant mortality, age distributions, ratio of urban population during 1901-1931 were the principal items for which statistical tables and graphs had been prepared. There was no clear evidence in available statistics to show that the population situation was becoming worse. On the contrary a very slight tendency towards improvement could probably be noticed. Prof. Karve, however, stressed the point that in the absence of any strong positive indication of reform, and in view of the comparatively backward position of India, the prospects before Indian people were far from hopeful.

The most interesting event in the life of the local Branch was the visit of the Secretary of the Institute, Prof. P. C. Mahalanobis. A select and distinguished company was invited to meet him at a lecture and At Home organised by the Local Branch at Fergusson College on the 3rd February 1935. Prof. Mahalanobis paid a compliment to the enthusiasm for statistical work shown in Poona. He rightly stressed the very important role played by the Meteorological Department for the development of statistics, and indicated the need of coordinated statistical work in India. On the 4th February he gave a discourse on "the recent developments in the theory of sampling distribution" at a meeting at the Meteorological Office. At the end of his stay he met the members of the Poona Branch in the Hall of the Servant of India Society to discuss lines of future work. Bibliography, local survey, theoretical study and co-operation with the Statistical Laboratory, Calcutta, were some of the points discussed at the meeting which was presided over by Dr. Normand. After the departure of Prof. Mahalanobis, whose visit was most helpful in establishing contacts and reaching a common understanding of aims, the Poona Branch met to discuss the steps that could be taken to organise the work. It was agreed that the Branches should help in preparing a bibliography of provincial publications of statistical interest. The Branch has also formed an Expert Sub-Committee consisting of Drs. Savur and Kalamkar for affording technical help to such workers in Poona as might need it. It is proposed to have a small discussion circle for the theoretical study of statistics in which Dr. Savur is taking great interest. It was felt that until further experience is gained, and an adequate and suitable personnel is trained for the work, a local inquiry cannot be undertaken by the Branch.

On the whole the year has witnessed a greater interest in the work of the Branch than in the previous year and it is hoped that in the coming year more concrete results of this increased interest will be visible.

MYSORE BRANCH.

Prof. Madhava, who was in charge of the Mysore Branch as its local Secretary, has sent the following report.

The main activities of this Branch are associated intimately with the Statistics, Economics, and Psychology Departments of the Mysore University under the charges respectively of Professors K. B. Madhava and V. L. De Souza and Dr. M. V. Gopalaswami.

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Advanced studies in theoretical statistics constituted an important part of the work carried on by K. B. Madhava, A. A. Krishnaswami Iyengar, M.A., and K. V. Krishna Sastri, M.A., and "Food Surveys", "Vagrancy Statistics", "Mortality Experience of Insured persons in the employment of Mysore Government", and "Biometric Studies from Family Histories of Indian Nobility" were some of the subjects studied during the year with the help of a number of students. Two advanced students were given special training in theoretical statistics and one student was engaged in writing a thesis on "India and the Depression."

Professor V. L. De Souza was engaged in compiling elaborate statistics of village surveys, a subject in which he has interested a large number of post-graduate students. He also guided and assisted C. Narasinha Murti, M.A., a research student, in preparing a thesis on "Federal Finance and Indian States."

Dr. M. V. Gopalaswami continued his experiments on several aspects of psychological studies, and with the help of his staff and students gathered a large amount of valuable statistical material.

BOMBAY BRANCH.

Prof. C. N. Vakil, the local Secretary was away in England for a long time, and consequently very little work was done in Bombay last year. On his return from abroad he desired to be relieved of his work as local Secretary on account of increased responsibilities. Prof. P. C. Mahalanobis who visited Bombay in February 1935 discussed the situation personally with him. As a result of this discussion a meeting of the local members of the Institute and other persons interested in statistical studies was held in the School of Economics and Sociology on the 7th February, 1935 under the chairmanship of Prof. Mahalanobis. A committee was formed to organise the work of the Bombay Branch with Prof. C. N. Vakil as Vice-President, and Prof. Ghuriye and Mr. Deshpande as Joint Secretaries. Prof. McLean of the Wilson College, Dr. Nazir Ahmed and Mr. Koshal of the Cotton Technological Laboratory, Mr. L. S. Vaidyanathan, F.I.A., and several other local members are taking an active interest, and it is hoped that the work of the Bombay Branch will soon be placed on a secure basis.

MEMBERSHIP.

Honorary Fellow. On the recommendation of the Technical Committee, the Council of the Institute, at its meeting of the 4th October, 1934, unanimously approved of the election of Prof. Corrado Gini of Rome as an Honorary Fellow. Prof. Gini, who is the editor of the international statistical journal "Metron", and is the head of the Statistical Institute in Rome, takes a keen interest in our work and has contributed a valuable paper in *Sankhyā* Vol. 1, Parts II & III.

Membership. The membership of the Institute at present consists of 2 Honorary Fellows, 2 Honorary Members, 17 Life Members, and 107 Ordinary Members.

We have much pleasure in noting that Prof. K. B. Madhava, Secretary of the Mysore Branch has been elected a Member-Titulaire of the International Institute of Statistics.

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AUDITED ACCOUNTS.

The Accounts for 1934-35 which were very kindly audited free of all charges by Messrs. P. C. Nandy & Co., Chartered Accountants, Calcutta are given below.

Receipts and Payments Accounts for the Year ending 31st March 1935.

RECEIPTS.	PAYMENTS.
To Opening Balance.	By Research Fellowship ... 800 0 0
Bank 1,410 4 0	.. Salaries 92 4 0
Cash 78 7 0	.. Postages 404 8 3
.. Donation 1,488 11 0	.. Contingencies 194 10 9
.. Mrs. P. C. Mahalanobis 600 0 0	.. Dr. H. Sinha in full settlement of accounts 691 7 0
.. Mr. N. Sarkar 100 0 0	.. Payment of Advance 322 1 8
.. Subscription 700 0 0	.. Mr. P. C. Mahalanobis 222 11 9
.. Ordinary Members 766 9 0	.. Art. Dress 500 0 0
	.. Closing Balance
	Bank 570 1 9
	Cash 48 14 0
	618 15 9
2,855 4 0	2,855 4 0
6, HASTINGS STREET, CALCUTTA, The 24th April, 1935.	Examined and found correct. Sd/- P. C. NANDY & Co., <i>Hony. Auditors,</i> <i>Chartered Accountants,</i> <i>Registered Accountants.</i>

CONCLUSION.

In the year under review, in the third year of its work, the Institute has definitely succeeded in winning public recognition. With the sanction of a recurring grant by the Government of India we may confidently look forward to years of steady progress.*

P. C. MAHALANOBIS,
Hony. Secretary.

* The Annual Report and Audited Accounts were adopted at the Third Annual General Meeting of the Indian Statistical Institute held in Calcutta on the 26th April, 1935.

THE INDIAN STATISTICAL INSTITUTE
PROCEEDING OF THE ANNUAL GENERAL MEETING
DATED THE 26th APRIL, 1935.

The Annual General Meeting of the Indian Statistical Institute was held in the Board Room of Messrs. Martin & Co., 12, Mission Row, Calcutta, at 3 P.M. on Friday, the 26th April, 1935.

In the unavoidable absence of the President, Sir R. N. Mookerjee, Mr. D. P. Khaitan, one of the Vice-Presidents took the Chair.

The following members were present :—

Sir E. C. Benthall (*Messrs. Bird & Co.*),
Mr. S. S. Bose (*Statistical Laboratory, Calcutta.*),
Mr. N. Chakravarty (*Inspector of Factories, Bengal.*),
Prof. K. N. Chakravarty (*Presidency College, Calcutta.*),
Mr. H. C. Ghose (*Lecturer, Calcutta University.*),
Mr. H. D. Ghose (*Indian National Chamber of Commerce, Calcutta.*),
Mr. R. Gupta (*Government Commercial Institute, Calcutta.*),
Mr. W. Laidlaw (*Messrs. Mackinnon Mackenzie & Co., Calcutta.*),
Prof. P. C. Mahalanobis (*Presidency College, Calcutta.*),
Mr. K. C. Mahindra (*Messrs. Martin & Co., Calcutta.*),
Dr. H. Sinha (*Lecturer, Calcutta University.*),
Prof. J. C. Sinha (*Presidency College, Calcutta.*).

1. The Secretary placed before the meeting the annual report and accounts for 1934-35 as approved by the Council, and mentioned that the accounts had been audited free of charge by Messrs. P. C. Nandy & Co., Chartered Accountants.

Resolved that the annual report and audited accounts for 1934-35 (previously circulated) be adopted.

Proposed by Mr. D. P. Khaitan

Seconded by Mr. W. Laidlaw

(Carried unanimously).

2. Resolved that Sir R. N. Mookerjee, K.C.I.E., K.C.V.O., be re-elected President of the Indian Statistical Institute for 1935-36.

Proposed by Mr. D. P. Khaitan

Seconded by Prof. P. C. Mahalanobis

(Carried unanimously).

3. Resolved that Prof. P. N. Banerjee, Sir E. C. Benthall, Mr. D. P. Khaitan, Dr. John Matthai (Simla), Mr. S. P. Mookerjee, Dr. C. W. B. Normand (Poona), Sir C. V. Raman (Bangalore), Raja Sir M. N. Roy Choudhury, Lala Shri Ram (Delhi), Mr. N. R. Sarker, Mr. B. M. Sen and Sir M. Visveswaraya (Mysore) be elected Vice-Presidents of the Institute for 1935-36.

Proposed by Mr. W. Laidlaw

Seconded by Prof. J. C. Sinha

(Carried unanimously).

4. Resolved that Mr. K. C. Mahindra be re-elected the Honorary Treasurer of the Institute for 1935-36.

Proposed by Mr. H. C. Ghose

Seconded by Mr. S. S. Bose

(Carried unanimously).

5. Resolved that Prof. P. C. Mahalanobis be re-elected the Honorary Secretary and Mr. H. C. Ghose and Dr. H. Sinha Honorary Joint Secretaries of the Institute for 1935-36.

Proposed by Mr. D. P. Khaitan

Seconded by Mr. R. Gupta

(Carried unanimously).

6. Resolved that the following branch Secretaries be elected for 1935-36 :—

(1) Prof. G. S. Ghurye and Mr. S. R. Deshpande (*Bombay branch*).

(2) Prof. D. G. Karve (*Poona branch*).

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(3) Prof. K. B. Madhava (Mysore branch).

Proposed by Prof. P. C. Mahalanobis

Seconded by Mr. H. C. Ghose

(Carried unanimously).

7. Resolved that the following persons be elected members of the Council for 1935-36. Mr. N. K. Adyanthya (Statistician, Government of Madras), Prof. Bhai Balakrishna (Agricultural College, Lyallpur, Punjab), Prof. H. R. Batheja (Member, Indian Tariff Board), Dr. G. S. Bose (Head of the Department of Psychology, University of Calcutta), Prof. S. N. Bose (University of Dacca), Mr. S. S. Bose (Statistical Laboratory, Calcutta), Mr. W. A. Burns (Vice-Chairman, Port Commissioners, Calcutta), Prof. K. N. Chakravarti (Presidency College, Calcutta), Mr. Nataraj Chakravarti (Inspector of Factories, Calcutta), Mr. H. P. Gandhi (Indian Chamber of Commerce), Dr. B. S. Guha (Anthropologist, Indian Museum), Dr. R. D. Gupta (Director, Bureau of Statistics, Coimbatore), Dr. C. J. Harrison (Chemist, Textile Experimental Station, Assam), Mr. J. V. Joshi (Deputy Director of Commercial Intelligence and Statistics, Government of India), Prof. V. G. Kale (Ferguson College, Poona), Dr. K. J. Kalanika (Meteorological Department, Poona), Mr. Renukay (Messrs. James Finlay & Co., Calcutta), Mr. W. Laidlaw (Messrs. Maximsian Mackenzie & Co., Calcutta), Prof. R. B. Lal (All-India Institute of Hygiene, Calcutta), Dr. S. K. Mitra (Economic Research, Assam), Rai Sahab Debnarayan Mukherjee (Principal, Training College, Agri), Prof. Radha Kama Mukherjee (University of Lucknow), Mr. M. K. Powala (Messrs. Tata Iron and Steel Co., Ltd.), Mr. T. J. Roxburgh (I.C.S., Judicial Secretary, Bengal), Dr. S. R. Saver (Meteorologist, Poona), Prof. N. R. Sen (University of Calcutta), Prof. J. C. Sinha (Presidency College, Calcutta), Mr. N. S. Subba Rao (Director of Public Instruction, Mysore), Mr. B. T. Thakur (Central Bank of India, Raigoon), Mr. R. A. Towler (Messrs. McLeod & Co., Calcutta), Mr. M. A. Vaidyanathan (Statistician, Imperial Council of Agricultural Research).

Proposed by Mr. D. P. Khaican

Seconded by Mr. N. Chakravarti

(Carried unanimously).

8. Resolved that this meeting places on record its appreciation of the services of Messrs. P. C. Nandy & Co., Chartered Accountants, who had audited the accounts free of all charges.

Proposed by Prof. P. C. Mahalanobis

Seconded by Dr. H. Sinha

(Carried unanimously).

9. Resolved that Messrs. P. C. Nandi & Co., Chartered Accountants, be requested to serve as Honorary Auditors for 1935-36.

Proposed by Mr. W. Laidlaw

Seconded by Prof. J. C. Sinha

(Carried unanimously).

10. The Secretary reported that the Technical Committee and the Council had approved of the election of Prof. Corrado Gini, Head of the Institute of Statistics, Rome, and Editor, "Metron" as an Honorary Fellow of the Institute.

Resolved that Prof. Corrado Gini be elected an Honorary Fellow of the Indian Statistical Institute.

Resolved further that the Secretary be requested to send a suitable communication to Prof. Gini.

Proposed by Mr. D. P. Khaican

Seconded by Dr. H. Sinha

(Carried unanimously).

11. Considered the budget estimates for 1935-36 as passed by the Council. (Recorded).

12. Considered the recommendation of the Council regarding a grant of Rs. 5,000/- per annum from the Government of India.

Resolved that a Government of India grant of Rs. 5,000/- per annum for 3 years with effect from 1935-36 be accepted on the following conditions mentioned in letter No. F36-7(b)/34-E, dated the 3rd April, 1935 from the Secretary, Department of Education, Health and Lands, Government of India, forwarded to the Hon. Secretary, Indian Statistical Institute, as enclosure to letter No. 1867 Edn., dated the 17th April, 1935 of the Education Department, Government, Bengal:—

(i) That an annual report of the working of the Institute, together with a duly audited statement of accounts, will be furnished regularly to the Government of India, and

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(ii) That the Institute will be prepared to attend to enquiries of a statistical nature, to take up special investigations involving statistical analysis of data, and to give special courses of training (extending from one month to a year in duration) in analytic statistics to officers deputed by Government Departments, Universities and other recognised institutions.

Proposed by Mr. D. P. Khaitan

Seconded by Mr. R. Gupta

(Carried unanimously).

13. Resolved further that a Standing Committee consisting of the following persons with powers to co-opt be appointed to initiate and guide research work in connection with the research grant of Rs. 5,000/- per annum sanctioned by the Government of India for three years with effect from 1935-36.

Prof. G. S. Bose (Head of the Department of Psychology, Calcutta University), Mr. P. H. Carpenter (Chief Scientific Officer, Indian Tea Association), Prof. K. B. Mallava (University of Mysore), Dr. John Mathai (Director General of Commercial Intelligence and Statistics, India), Dr. C. W. B. Normand (Director General of Observatories, India), Mr. T. J. Y. Raskarbh (I.C.S., Judicial Secretary, Bengal), Mr. D. M. Sen (Principal, Presidency College, Calcutta), Prof. N. R. Sen (University of Calcutta), Dr. H. Sinha (Lecturer, University of Calcutta) with Prof. P. C. Mahalanobis to act as Secretary.

Proposed by Mr. D. P. Khaitan

Seconded by Mr. R. Gupta

(Carried unanimously)

14. Considered the recommendation of the Council regarding examinations for diplomas in statistics.

Resolved that a Committee consisting of the following persons with powers to co-opt be appointed to report to the Council the action to be taken for instituting examinations for the award of certificates or diplomas in statistics.

Dr. L. K. Hyder (Member, Public Service Commission, India), Mr. D. G. Karve (Principal, Willingdon College, Salara), Prof. J. McLean (Wilson College, Bombay), Prof. K. B. Mallava (University of Mysore), Dr. J. Mathai (Director General of Commercial Intelligence and Statistics, India), Mr. S. P. Mukherjee (Vice-Chancellor, Calcutta University), Dr. C. W. B. Normand (Director General of Observatories, India), Prof. E. S. Pearson (University of London), Prof. N. R. Sen (University College of Science, Calcutta), Dr. H. Sinha (Lecturer, University of Calcutta), Mr. M. Vaidyanathan (Statistician, Imperial Council of Agricultural Research, Delhi), with Prof. P. C. Mahalanobis as Secretary.

Proposed by Prof. P. C. Mahalanobis

Seconded by Dr. H. Sinha

(Carried unanimously).

15. Considered a recommendation of the Council regarding the need of scrutiny of official statistical publications.

Resolved that a Committee consisting of the following members, with powers to co-opt, be appointed to scrutinize the form and contents of official statistical publications and make suitable recommendations.

Dr. John Mathai; Prof. J. C. Sinha; Prof. P. C. Mahalanobis; one member each to be appointed by the Bengal Chamber of Commerce, the Bengal National Chamber of Commerce and the Indian Chamber of Commerce, with Dr. H. Sinha as Secretary.

Proposed by Mr. K. C. Mahindra

Seconded by Mr. S. S. Bose

(Carried unanimously).

16. Resolved that this meeting places on record its appreciation of the services rendered to the Institute by the retiring office-bearers and members of the Council.

Proposed by Mr. K. N. Chakravarty

Second by Mr. R. Gupta

(Carried unanimously).

The Meeting terminated with a vote of thanks to the Chair.

D. P. KHAITAN
Chairman.

P. C. MAHALANOBIS
Hony. Secretary.

PROCEEDING OF THE COUNCIL OF THE INDIAN STATISTICAL INSTITUTE.
1934-35.

A meeting of the Council of The Indian Statistical Institute was held in the Board-room of Messrs. Martin & Co., 12, Mission Row, Calcutta at 2.45 P.M. on Friday the 26th April, 1935.

Chairman: Sir E. C. Benthall, Vice-President, in the chair.

Present: Messrs. K. N. Chakravarti, N. Chakravarti, H. C. Chosh, W. Laidlaw, D. P. Khaitan, K. C. Mahindra, J. C. Sinha, H. Sinha and P. C. Mahalanobis.

1. Proceedings of the Council Meeting dated 4th October, 1934 were read and confirmed.

2. Resolved that the Draft Annual Report and Audited Accounts (circulated) be approved and forwarded to the Annual Meeting.

Carried unanimously.

3. Resolved that the following Budget Estimates for 1935-36 be adopted and be forwarded to the Annual Meeting for information.

Carried unanimously.

Budget Estimates for 1935-36.

RECEIPTS.	Rs.	EXPENDITURE.	Rs.
(1) Grant from the Government of India ...	5,000	(1) Research Staff ...	3,000
(2) Membership fees (107 ordinary members) ...	1,600	(2) Books & Journals ...	1,000
(3) Miscellaneous and new Members ...	400	(3) Calculating Machines and Accessories ...	1,000
		(4) Contribution for Journal (125 @ 10/-) ...	1,250
		(5) Part-time Clerk & Peon ...	250
		(6) Postage ...	250
		(7) Printing, Stationery and Contingency ...	250
TOTAL ...	7,000	TOTAL ...	7,000

4. Considered letter No. F.36-7(b)/34-E, dated the 3rd April, 1935, from the Secretary, Department of Education, Health and Lands, Government of India, forwarded to the Hon. Secretary, Indian Statistical Institute, as enclosure to letter No. 1867 Edu., dated the 17th April, 1935 of the Education Department, Government of Bengal.

Resolved that the Council recommends to the Institute the acceptance from the Government of India of a research grant of Rs. 5,000/- per annum for 3 years with effect from 1935-36 on the following conditions:—

- (i) that an annual report of the working of the Institute, together with a duly audited statement of accounts will be furnished regularly to the Government of India, and

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- (ii) that the Institute will be prepared to attend to enquiries of a statistical nature, to take up special investigations involving statistical analysis of data, and to give special courses of training (extending from one month to a year in duration) in analytic statistics to officers deputed by Government Departments, Universities and other recognised institutions.

Carried unanimously.

5. Resolved further that the Council recommends to the Institute that a Standing Committee be appointed to initiate and guide research work in connexion with the Research Grant of Rs. 5,000/- per annum sanctioned by the Government of India.

Carried unanimously.

6. The Hon. Secretary made a statement regarding the need of a careful scrutiny of the form and contents of official statistical publications, and reported that he had discussed these questions during his visit to Poona and Bombay Branches in February and with Government officials during his visits to New Delhi in March and April. He also reported the results of Dr. H. Sinha's conversations with the Chambers of Commerce, University authorities and other interested persons in Calcutta.

Resolved that a Committee consisting of the following members with powers to co-opt be appointed to scrutinise the form and content of official statistical publications and to make suitable recommendations.

- (1) Dr. J. Mathai, (2) Prof. J. C. Sinha, (3) Prof. P. C. Mahalanobis, (4, 5, 6) One nominee each of the Bengal Chamber of Commerce, the Bengal National Chamber of Commerce, and the Indian Chamber of Commerce, (7) Dr. H. Sinha (Secretary).

Carried unanimously.

7. Resolved that the Council recommends to the Annual Meeting that a Committee consisting of the following members with powers to co-opt be appointed to report to the Council regarding the action to be taken for instituting examinations for the award of certificates or diplomas in statistics.

Dr. L. K. Hyder (Member, Public Service Commission, Delhi); Mr. D. G. Karve (Principal, Willington College, Naluru); Prof. J. McLean (Wilson College, Bombay); Prof. K. B. Malhava (University of Mysore); Dr. J. Mathai (Director General of Commercial Intelligence and Statistics, India); Mr. S. P. Mukherjee (Vice-Chancellor, Calcutta University); Dr. C. W. D. Norman (Director General of Observatories in India); Prof. B. S. Pearson (University of London); Prof. N. R. Sen (University College of Science, Calcutta); Dr. H. Sinha (Lecturer, University of Calcutta); Mr. M. Vainyanathan (Statistician, Imperial Council of Agricultural Research, Delhi); with Prof. P. C. Mahalanobis as Secretary.

Carried unanimously.

8. Resolved that the following recommendations be made for election of office-bearers and members of the Council during 1935-36.

President: Sir R. N. Mookerjee, K.C.I.E., K.C.V.O.

Vice-Presidents: Prof. P. N. Banerjee, Sir E. C. Denthall, Mr. D. P. Khaitan, Dr. John Mathai (Simla), Mr. S. P. Mookerjee, Dr. C. W. D. Norman (Poona), Sir C. V. Raman (Bangalore), Raja Sir M. N. Roy Choudhury, Jala Shri Ram (Delhi), Mr. N. R. Sarker, Mr. B. M. Sen, Sir M. Visweswaraya (Mysore).

Treasurer: Mr. K. C. Mahindra.

Secretary: Prof. P. C. Mahalanobis.

Joint Secretaries: Dr. H. Sinha and Mr. H. C. Ghose.

Branch Secretaries: Prof. D. G. Karve (Poona), Prof. K. B. Madhava (Mysore), Prof. Ghurye and Mr. Deshpande (Bombay).

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Members of the Council: Mr. N. K. Adyanthava (Staffiktion, Government of Madras), Prof. Bhai Bahinabhai (Agricultural College, Lyallpur, Punjab), Prof. H. R. Bahaja (Member, Indian Tariff Board), Dr. G. S. Bose (Head of the Department of Psychology, University of Calcutta), Prof. S. N. Bose (University of Dacca), Mr. S. S. Bose (Statistical Laboratory, Calcutta), Mr. W. A. Bursu (Vice-Chairman, Port Commissioners, Calcutta), Prof. K. N. Chakravarti (Presidency College, Calcutta), Mr. Nataran Chakravarti (Inspector of Factories, Calcutta), Mr. H. P. Gandhi (Indian Chamber of Commerce), Dr. B. S. Guha (Anthropologist, Indian Museum), Dr. R. B. Gupta (Director, Bureau of Statistics, Cawnpore), Dr. C. J. Harrison (Chief Chemist, Textile Experimental Station, Assam), Mr. J. V. Joshi (Deputy Director of Commercial Intelligence and Statistics, Government of India), Prof. V. G. Kale (Professor, College, Poona), Dr. R. J. Kalamkar (Meteorological Department, Poona), Mr. Reib-Kay (Messrs. James Finlay & Co., Calcutta), Mr. W. Laillaw (Messrs. Mackinnon Mackenzie & Co., Calcutta), Prof. R. B. Lal (All-India Institute of Hygiene, Calcutta), Dr. S. K. Mitra (Economic Botanist, Assam), Rai Saleb Debnaryan Mukherjee (Principal, Training College, Agra), Prof. Kaisha Kamal Mukherjee (University of Lucknow), Mr. M. K. Powvala (Messrs. Tata Iron and Steel Co., Ltd.), Mr. T. J. Y. Roxburgh (I.C.S., Judicial Secretary, Bengal), Dr. S. R. Sabour (Microbiologist, Poona), Prof. N. R. Sen (University of Calcutta), Prof. J. C. Sinha (Presidency College, Calcutta), Mr. N. S. Sabha Rao (Director of Public Instruction, Mysore), Mr. B. T. Thakur (Central Bank of India, Rangoon), Mr. R. A. Towler (Messrs. McLeod & Co., Calcutta), Mr. M. A. Vaidyanathan (Statistician, Imperial Council of Agricultural Research).

Carried unanimously.

9. The Hon'y. Secretary reported that Sankhyā was being published in co-operation with the Indian Statistical Institute with the help of a Committee appointed by the Institute.

Resolved that the following members be elected to the Journal Committee:—

Prof. P. N. Banerjee; Prof. K. B. Madhava; Prof. P. C. Mahalanobis (Editor, ex-officio); Dr. John Matthai; Mr. T. J. Y. Roxburgh; Prof. N. R. Sen with Dr. H. Sinha as Secretary.

Carried unanimously.

Confirmed.

S. P. MOOKERJEE,
Chairman.

P. C. MAHALANOBIS,
Hon'y. Secretary.