

U. S. Vishan

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THE
INDIAN ASSOCIATION
FOR THE
CULTIVATION OF SCIENCE

Annual Report for the Year 1942.

PRESIDENTIAL ADDRESS

ANNUAL ADDRESS 1942

Gentlemen, in rising to address you at your annual meeting I feel proud that I have been judged worthy to occupy an office which is associated with the names of many who have honoured our country. I am afraid I would not be regarded by you to have justified your choice which has placed me in this dignified position, if I did not try to prove myself equal to my predecessors in a desire to discharge efficiently my duties as your president to the credit of your Association and to the advancement of science and its applications. The subject of my thesis is *the Indian Association for the Cultivation of Science, its beginning and its future.*

THE BEGINNING

In December 1869 the establishment of an association for the advancement of science was advocated by Dr. Mahendra Lal Sircar in an article in the *Calcutta Journal of Medicine*. The proposal was favourably received by the press and the Indian public.

Small as was the beginning of the *Indian Association for the Cultivation of Science*, it might be said of it, what Sir William Jones foretold about the Royal Asiatic Society of Bengal, that "An institution so likely to afford entertainment and convey knowledge of mankind, will advance to maturity by slow, yet certain degrees". Its beginning was not smaller than that of the Royal Society of London which was at first a meeting of only a few literary friends of Oxford, rising gradually to that splendid zenith, at which a Newton was once president and a Halley secretary, and which is standing to-day pre-eminent among similar institutions all over the world.

A sketch of the original scheme of the Science Association was given by Mahendra Lal Sircar on 16th December, 1875 in

the meeting of the Provincial Committee in the rooms of the Sanskrit College. The scheme shows Mahendra Lal's great breadth of mind, his remarkable vision, his depth of knowledge, and the vast potentialities of his ideas. I am quoting from it rather freely and hope you will pardon me for doing so.

"The object of this Association is to enable the Natives of India to cultivate science in all its departments, with a view to its advancement by original research and with a view to its varied applications to the arts and comforts of life.

"In none of the existing educational institutions of Bengal, with the exception to some extent only of the medical schools, is any provision to be found for the thorough and practical teaching of science.

"An elementary education of the mind in the principles of all the branches of science is necessary as a healthy preliminary to the successful cultivation of any one branch. As matters stand, it is necessary that the Association should provide for such elementary teaching, in addition to its functions of organising original investigations. The extent of the field covered by each branch of science is so vast, that it is not possible for a single mind to master the details of all, far less to extend their boundaries. A single branch is more than sufficient to form one man's speciality. This necessitates in the serious cultivation of science, a division of labour, a differentiation of function or duty. It is necessary therefore to have sections in the Association devoted to the branches which ought to be separately studied for their due cultivation.

"It is not possible to give the exact number and names of the sections which a perfect scientific institute ought to have. The British Association had very often to make changes in this matter. The details and the development might well be left to competent persons and to time. I can give you here only a few general ideas on the subject. We must have sections for General Physics and Chemistry, as these constitute as it were the backbone of science, and without them no other branch can be studied with any advantage. Then follows Astronomy which has now grown into a separate entity consisting partly of Physics and

partly of Chemistry. We have next to consider Biology, which as you know is divisible into two departments, the science of plant life and the science of animal life,—Botany and Zoology. Physiology common to these two life worlds has been found advantageous in very recent times to be constituted into a separate branch. There is another science calling up the past history of the globe in which we live, and introducing us into the threshold, as it were, of the genesis of other worlds. This is Geology.

“Confining our attention, then, only to the sciences I have enumerated, and without minding for the present their varied ramifications, each of which is ample enough to claim a section to itself, we ought to have at least seven sections in our Association, namely—

- (1) One for General Physics
- (2) One for Chemistry
- (3) One for Astronomy
- (4) One for Systematic Botany
- (5) One for Systematic Zoology
- (6) One for Physiology
- (7) One for Geology

“For each of these sections I would have a head worker selected from among the graduates of our colleges who should take charge of the section, devote himself entirely to the prosecution of the experimental study of the science assigned to it, by the aid of books and instruments placed at his disposal, and under the guidance of men who have made the subject their speciality.

“If we are happy in the selection of our workers, it is my firm belief, they will succeed, in the course of a year, so to master their respective subjects that they will be able to deliver systematic lectures in them. In this way in course of time they will gradually be led to make original investigations, some of which at least will be successful and lead to important results.

“When our workers will become competent to teach in their respective subjects, then we shall be able to institute two series of lectures on each subject, one general for the general

public, and the other special for the instruction of a few who would like to form themselves into a class to learn the subjects. In this way we shall have in each section under the head worker, a few sub-workers as it were, who by virtue of the training they will receive will soon become workers in science themselves, and will be of help to the Institution as well as to the community in general. In this way a taste for science will soon be disseminated among the general community, and science will then count her votaries by thousands and hundreds of thousands, instead of scarcely, as now, by units. And then India of her own accord, unaided and unsolicited, will equip and send out scientific expeditions, as civilised governments under pressure are now doing. No part of the world requiring exploration will be without explorers from India. Not a single phenomenon can occur, either in the heavens above or in the earth below, which can be predicted beforehand and the observation of which might be of scientific interest and importance, which India will not send her scientific men to observe and record.

“All the sections I have enumerated, and even more, are workable if we had only funds to meet the expenses. There will be no want of workers if we could only provide for them, and we must provide for them, that is remunerate them properly. In Europe and America this leisured thinking is secured largely by state and other appointments. In our country such appointments do not exist, and it is chiefly with a view to supply the deficiency and the desideratum that I have been striving to found this Association.

“What then is likely to be the expense of setting up and working the sections mentioned above? This resolves itself into—

- (1) The expense of purchasing books and instruments once for all at present.
- (2) The expense of building a local habitation.
- (3) The expense necessary for the remuneration of our workers, and
- (4) The expense that will be incurred for carrying on experiments and other business.

“The scheme I have submitted is capable of indefinite development and its success depends, as I have over and over again said, upon one thing—and that is money. And is money wanting in this land of ‘barbarick pearl and gold’? Is the inclination to spend money wanting? Certainly not. All that is wanting is that we should learn the right use of our pearl and gold.”

The founder desired the Association to be a seat of science learning, science teaching and actual science research. He desired it to be solely and purely national. His ambition was that the institution would combine the character, the scope and the object of the Royal Institution of London, and of the British Association for the advancement of science. He also aspired to see the Science Association grow and prosper into an institution where his own countrymen, after finishing their university education would, on their own account, do original research in the different branches of science. To put it shortly, the founder dreamt of having an institution exactly similar in certain respects to the Calcutta University College of Science of to-day, of which the illustrious founder was Sir Asutosh Mookerjee.

When the scheme had just reached maturity it had to pass through a severe crisis. Another scheme for a technical institution was set on foot by the Indian League, with the object of combining scientific instruction with practical training, and drilling men in the arts which would constitute the manual and mechanical industries. It was proposed that Dr. Sircar's scheme and the Indian League's project should be amalgamated and form a single institution where the teaching of science would be combined with instructions in mechanical arts which would open new ways of living for the people of the country. Mahendra Lal Sircar and many of his colleagues were opposed to this idea. After a good deal of controversy in the papers and animated and sometimes acrimonious discussions at a joint meeting of the organisers of the Science Association and the Indian League held at the Senate House under the presidency of Sir Richard Temple, Lt. Governor of Bengal, he after taking the sense of the meeting declared that the two schemes could not be amalgamated and that they were allowed to have separate existence.

The Government of Bengal acquired the present site of the Association with some old buildings, situated thereon at a cost of Rs.50,000 and made it over to the committee of management on certain conditions which were duly fulfilled. Subsequently, the Government kindly agreed to accept Rs. 30,000 for the old house and land and the property became absolutely that of the Association after the sum was paid by it. The inaugural meeting of the Association was held at the new premises on the 29th July, 1876 under the presidency of Sir Richard Temple and in the presence of the elite of Calcuttā and crowded audience filling every nook and corner of the house. Nothing could be more gratifying to the promotion of the Association than the gushing enthusiasm among the educated people of Bengal. The work of the Association practically began on that date. On 18th March, 1880 Lord Lytton attended the lecture delivered by Mahendra Lal Sircar on *ultragaseous state of matter*.

The ceremony of laying the foundation stone of the new buildings of the *Indian Association for the Cultivation of Science* was performed on the 13th March, 1882 by His Excellency the Marquess of Ripon aided by His Honour Sir Ashley Eden, Lt, Governor of Bengal, in the presence of a large and distinguished gathering of European high officials and the elite of the Indian Society.

On March 12, 1884 the lecture hall of the Association was inaugurated by Lord Ripon and on 27th March, 1890 Lord Lansdowne laid the foundation stone of the Vizianagram Laboratory.

With the laying of the foundation stone of the new building of the Association ended the first period of its past history. It was once suggested that the name of the institute should be Albert Science Association in honour of the Royal visit to India. But the suggestion was withdrawn as the permission or authority of His Royal Highness had not previously been asked for.

Gentlemen, I cannot help referring here to the most valuable aid which Dr. Mahendra Lal Sircar obtained from Father Lafont of the St. Xavier's College in his enterprise for founding this institution. It is not too much to say that it would have been extremely difficult to make our institution come into

existence without Father Lafont's most earnest efforts, zeal and sympathy. I must also refer to the efforts of the landed aristocracy and educated community of Bengal who helped enthusiastically in its creation.

I end the first part of my address the "*Beginning of the Indian Association for the Cultivation of Science*" by quoting the following significant lines from the speech of His Excellency Lord Lytton, Viceroy and Governor General of India, when he paid a visit to it on Thursday, the 18th March, 1880, a few years after it was instituted.

"I venture to express an opinion that the English educational authorities in this country could not possibly confer a greater benefit upon the mind of the young native generation in India than by training it to habits of positive thought, positive enquiry and observation. But how infinitely greater, how infinitely more valuable, how infinitely better, assured of permanence and growth, must this great benefit become, when, as in the present case, it is spontaneously sought and energetically self-acquired. It seems to me that it is just such a benefit as this which the present admirable institution has conferred upon this great province of Bengal. It is a genuinely native institution, which originated in the wise and patriotic conception of a native gentleman who is himself a genuine man of science. It has depended for its support solely on the enlightened and public spirit of those native gentlemen whose liberality is the source of its beneficence. Well then, of those who have thus far supported this institution, I say that theirs, and theirs exclusively, is honour due to the rapid growth and achievement of this most promising offspring of their individual wisdom and social activity.

"They it is who are the parents of the future conquerors and greatest benefactors of India. It is they who in this Province of Bengal have enlisted and are enlisting native thought, native research, native industry and above all, native knowledge in the ranks of that band—that little band it may be now, but which is destined, I trust, year by year, more and more, further and further, to carry throughout the length and breadth of India the over-widening light of the great practical truths which belong to

science. The founders and supporters of this institution are, I conceive, doing here in this Province of Bengal all that in them lies to advance for their countrymen in India, the advent of that day, yet distant no doubt from us all, but still not invisible to the eye of faith, when man's life may perhaps by a more positive knowledge of the nature of God's works be brought into more positive harmony with the purposes of God's will.

"I venture to think that in the meanwhile at least much, very much has been gained, and is being gained in progress towards such a goal by the enlightened association thus far of Mahomedan with Hindu gentlemen, in this most valuable enterprise for the advancement of native science in Bengal. And let me beg you to remember that the cause of science here in India is really of all causes the most deserving, the most beneficent, and the most charitable.

"On behalf, of all those great human interests, on behalf of all such noble human workers and in the name of that good cause, which commands my entire sympathy and esteem, I beg to congratulate most cordially Dr. Sircar, my friends the Maharaja Jotindra Mohan Tagore, and Moulvie Abdul Latief, and all the other enlightened native gentlemen by whom it is supported, on the establishment and flourishing existence in Calcutta, of an institution where it is possible for all, to derive profit and instruction."

I shall not dilate upon the middle period of the existence of our Association. They have been well reported in our published Annual Reports. Nor shall I refer to the activities in the year under review as they will be described by our illustrious Honorary Secretary who has been trying to raise our institution to a high standard of efficiency. To him we owe our grateful thanks for what he has done and been doing for our Association.

I shall just quote here what the *Nature* thought in 1916 about the importance of our Association soon after it was founded.

"The genetic relation between the serious pursuit of natural science and the profession of medicine is nowhere better illustrated than in British India, and in British India

nowhere better than by the Asiatic Society of Bengal, and by its congener, the Indian Association for the Cultivation of Science, founded in 1876 by Dr. Mahendra Lal Sircar, a practitioner of medicine in the Indian quarter of Calcutta.

"At a time when Indian Universities were purely examining bodies so dear to the Philistine soul, when secondary education in India was mainly bookmongery (to call it "literary" would be a fault to heaven), and literary gentlemen were brought from England to feed raw Indian youths with husks of commentary laboriously ground from the English classics, Dr. Mahendra Lal Sircar, a medical man immersed in the anxieties of a private practice, was probably the only educated Indian in Bengal whose ideas of education were approximately those held generally today by men of science in Great Britain.

"Dr. Sircar, a man of great sagacity and urbanity, did not agitate or make a noise, but, with single-minded devotion to higher issues, he set a-going in a convenient part of his native town, and for many years carefully fostered. the aim of which, to begin with, was and had to be generally educative. This society was appropriately called an Association for the Cultivation of Science. By degrees, and by the accretion of laboratories for particular studies, the institution, while retaining an educational character, advanced to the differentiated technical stage; and now, beyond its educational purpose, it has become a well-organised and well-equipped institution for original experimental research."

Unfortunately today in 1943 more than twentyfive years later, we have not been able to expand our activities to such an extent as should have been naturally expected.

Our first President, Sir Richard Temple, was considered by Mahendra Lal Sircar to be the father of scientific education in India. He was succeeded by successive Lt. Governors of Bengal, by Sir Asutosh Mookerjee and other great sons of India. Our Association was registered in September 1909.

THE FUTURE.

A new feature in connection with the internal administration of our Association in future, is the creation of a new body of members to be called *fellows*. The proposal of the Committee of Management is now before you for your approval. The importance of such a body of members was well expressed by Sir Asutosh Mookerjee when he advocated the creation of a similar body in the Royal Asiatic Society of Bengal in 1910 in his Presidential Address. We have decided, as was done in the case of the latter, to recommend to you that the honour of our *fellowship* is to be conferred solely in recognition of distinguished research work conducted by our members. It cannot be denied that a membership as it is now has little or no attraction to the scholar whose main object is the advancement of knowledge. To alter our constitution so as to restrict admission to our membership only to persons noted for research, would obviously narrow the field of supply, and might indeed, in a brief space of time, prove suicidal. If we desire to attract to our ranks distinguished science workers in our country we must be prepared to bring about the creation of a body of members to be called *fellows*, a distinction which would be valued as recognition of merit of people engaged in the task of widening the bounds of scientific knowledge.

Next year we hope to be revising our rules and regulations which we shall bring up before you for approval.

I am glad to inform you that the number of our members has considerably increased during the present year. Since 1942 the number of life-members enlisted is seventeen and the number of ordinary members has increased by sixty. If it goes on in this way then our income from membership will be considerably increased in the course of a few years. I appeal to every member of our Association and especially of our Committee of Management to try to enlist at least five members in the succeeding year and if they succeed then we shall have a few hundred members in the course of one year.

The Professors and Lecturers of the various undergraduate colleges in Calcutta and other parts of Bengal and of the

University College of Science and the Bose Institute should join our Association and participate in its activities. We have a claim on the science teachers of the colleges in Bengal and especially in Calcutta as in the early days the students of the latter used to take training in practical classes at the Science Association.

Gentlemen, we have a scheme for selling the present valuable land on which our Association stands. We intend to remove to a place where land is cheap and near to the seat of scientific learning. Such a place may be in the suburbs of Calcutta somewhere near to the University College of Science. Out of the sale proceeds we shall be able to buy several bighas of land where we may construct a suitable building for various scientific societies of Calcutta for their habitation and meeting places similar to the Burlington House in London. I think the proposal is a feasible one. But this is hardly the time to give effect to such ideas in these days of war when building materials are very costly and the value of land very uncertain like many commodities. But we hope such a proposal may fructify and if it does we may have a fair amount of money at our disposal which may add to the corpus of our funds and thereby enlarge our activities.

Gentlemen, before we remove to a new site, the scientific societies in Calcutta should meet on a common platform in our present hall and exchange their thoughts. The abstracts of their deliberations may be reported in our Proceedings, the full texts published in appropriate journals. Let us try to arrange for a series of popular lectures here in scientific subjects which the public may attend with profit. Let us also arrange for holding meetings here for the discussion of scientific subjects in which researches are being carried on in different science subjects in Calcutta and Bengal.

The importance of an institution like ours cannot be exaggerated. It was here, Sir C. V. Raman carried on his researches which led to his being elected to the fellowship of the Royal Society of London and subsequently to his being created a Noble Laureate. It was here that Dr. Krishnan as Mahendra

Lal Sircar Professor of Physics conducted researches for which he was elected fellow of the Royal Society. I have every reason to believe that his successor Dr. Kedareswar Banerjee will keep the prestige of the chair which he will soon occupy.

It is here that meteorological observations have been carried on extending over several years. It is my desire to investigate whether the incidence of some of the diseases in the past in Calcutta could be correlated to meteorological changes in the atmosphere in Calcutta.

We shall try to renovate our chemical laboratory which is now in a deplorable state. I am glad to say that the organisers of Sir Prafullachandra Ray Professorship fund intend to make over to us the interest of the accumulated sum of Rs. 25,000/- which they have decided to invest in $3\frac{1}{2}\%$ P. Notes and which will form the nucleus for the creation of a Chair in his name. But the rate at which subscriptions to this fund are coming in should be much quicker. Otherwise it will take several years before the Chair actually comes into existence.

For the present we shall try to create a Fellowship in Sir P. C. Ray's name. If the Committee of Management agree, our department of chemistry will take up the study of some of the most important problems in Chemistry such as industrial which is needed for the benefit of the country.

It may be desirable for us to approach the Governments of India and Bengal, the Board of Scientific and Industrial Research and the Rockefeller Foundation to subsidise chemical research in our Association.

I now come to the end of my address. I chose my thesis to be *the beginning and the future of the Indian Association for the Cultivation of Science*, to create in the minds of my audience and the public an interest in an institution which was created by the great Mahendra Lal Sircar. Speaking of him Sir Asutosh Mookerjee remarked at the Annual Meeting of the Association in June 1904: "It is not too much to say that I owe to him my success in life, and that without his helping hand I would have been nowhere. He was not only my father's friend, not only my

friend, but after my father's death, he was more than a father to me".

Unfortunately Mahendra Lal did not live to see the consummation of his dreams. In his last address at the annual meeting of our Association he made the following pitiful remarks:

"Believing that this Annual Meeting of our Association is in all probability the last which will be held in my life-time, I have made a supreme effort to overcome my physical weakness, so that I may be able to unload my heart before you, but I have not strength enough to express all that I feel at the present moment.

"I can only give expression to one feeling that has taken over-powering possession of me, and that is a feeling of regret, regret at having wasted a life. I have failed in fulfilling a task which I had imposed upon myself and for which I had solicited your co-operation. Co-operation I have had, co-operation unexpectedly splendid and liberal, but co-operation of a few only, of scarcely over a hundred out of hundreds of thousands of my educated countrymen, out of sixty millions of Bengal, and if we like, out of 300 millions of India, for it was my ambition to make the project entirely national embracing the whole continent with its diverse races and peoples."

Today the position is not so pessimistic as Mahendra Lal thought. The tiny seed that he planted has grown into a tree which has been yielding fruit, but very slowly except in the science of Physics which has done splendid work and has created a school of Physics under our auspices. Today the Science Association has been able to found research medals, research scholarships, research assistants, research fellowship, Mahendra Lal Professorship in Physics and let us hope a Sir P. C. Ray Fellowship in Chemistry will soon be created. Among the recipients of our Joy Kissen Mookerjee medal are Sir E. J. Russell, Sir James Jeans, Professor Aston and Professor Millikan. Among our Ripon Professors were Sir Lewis Fermor and Sir Arthur Hill. Our Coochbehar lecturer was Professor Lennard-Jones. All of these savants delivered lectures in our Association in 1938. We

succeeded sometime ago to have a Science Convention and scientists from various parts of India used to meet to read scientific papers here. Let it be renewed. We have published *Bulletins* of high value regularly and the *Indian Journal of Physics* containing valuable papers in Physics. We have turned out a Noble Laureate and two fellows of the Royal Society within a short period of time. But it is a pity that during a course of nearly fifty years our countrymen have not come forward to fulfil the earnest desire of the founder of our institution for creating more professorial Chairs than at present.

May the public spirit of the rich aristocracy, of the merchant princes and of the various professions in our country rise to a sense of duty towards our society and help us in extending our activities. Are there no enthusiasts in our country to-day such as those who looked after our society with remarkable zeal and energy when it was in the making ?

Mahendra Lal's last appeal to his countrymen, soliciting their help and co-operation in the maintenance and development of the Science Association was :

"To you, my dear Colleagues, from whom I received the heartiest sympathy and support, and to all our educated young men who have not yet come forward as they should have, I leave this Science Association of ours as a legacy which is calculated to regenerate our country. You will, I dare say, try your best to improve and develop it to its utmost capacity."

Gentlemen, may I hope that the Calcutta University College of Science which has risen today to be a great institution will not forget the *Indian Association for the Cultivation of Science* as a useless fossil but say :

"We came into the world like brother and brother

And now let's go hand in hand."

Let the two co-operate with each other for the good of our country. I am sure that the spirit of the great Mahendra Lal Sircar and that of the great Sir Asutosh Mookerjee will bless us if this is accomplished.

As has been said more than once, one of the objects of this Association is to popularise science, that is to undertake the work which is broadly speaking of an educative nature. But at the same time we must combine laboratory research with the propagation of science. The Royal Institution of London has had a very fine record in this direction. Its aims are the advancement of science by research and its popularisation. Our aims should be very much similar. It is interesting to mention here a somewhat quaint story that when some years ago the Science Association asked for affiliation to the Calcutta University, Sir Comer Petharam, the then Vice-Chancellor made a very significant remark on the position of affairs in those days. When the proposal was made to him, he said "Well, the affiliation of the Science Association to the Calcutta University is but a simple matter. But we should look forward to the day when the Calcutta University would seek to be affiliated to the Science Association."

I ask, was this a dream? Or is it possible that Sir Comer was thinking of certain lines of work which the University of Calcutta would not undertake, but the Science Association would, for which the University would seek affiliation to the Science Association? But whether this would be ever possible or not, it is evident Sir Comer thought that our institution had risen to such a high standard in his days that it could claim such a dignified position. Let us hope that Sir Comer's prediction will come to pass at some future date, however distant it may be.

Gentlemen, I am one of those who dream dreams. I often-times dream what should be our future activities. Some of them I have already mentioned. They are summarised here.

(1) The duties of our Professors should be partly their own research, partly to direct research and partly to application of research to the arts and comforts of life.

(2) We should try to invite men of eminence to deliver a series of lectures for the advancement of science as were done by such distinguished men as Father Lafont, Sir Asutosh Mookerjee, Sir J. C. Bose, Sir C. V. Raman, Sir P. C. Ray, Sir James Jeans, Professor Aston, Professor Millikan, Sir Lewis Fermor, Sir Arthur Hill, Professor Lennard-Jones and others.

(3) We should make arrangements as we have been doing at present for research by post-graduate students for the doctorate degrees of the different universities.

(4) We should try to hold regular meetings in which scientific subjects may be discussed by research workers of our Association. We hope to enlarge our Journal and try to publish Memoirs in important subjects.

(5) We should arrange for a series of popular lectures on scientific subjects for the benefit of the public such as those of Mr. P. Evans, Rai Bahadur Chuni Lal Bose or Mr. Giris Chandra Bose which were delivered in our Association.

(6) We should try to seek for full co-operation with the University College of Science, the Bose Institute, and with the science departments of the colleges affiliated to the Calcutta University as well as the Calcutta School of Tropical Medicine and the All India Institute of Hygiene.

(7) We should try to help as much as we can the Undergraduate Colleges of the Calcutta University by giving opportunities to their Professors and Lecturers to do research work in our laboratories just as we helped them in days-gone-by giving practical training in science subjects to their students.

(8) We should try to arrange for giving training in scientific subjects for the benefit of certain classes of students similar to what is imparted by the Polytechnics under the County Council of London. If necessary such instruction will be given in the evening to those who find no time during office hours to attend the classes during the day on account of their official duties.

Gentlemen, there should be no limit to the extent of the almost boundless field of our-activities, except what may be imposed by resources of personnel and of finance. It is for us and for every one who can afford to help us in our mission, to see that this limit is drawn as widely as possible.

It is a hopeful sign to note that we have increased our ordinary as well as our life-members to a considerable extent very recently and if this increase goes on, then we shall be able to get sufficient sums of money to help us in creating a new Chair within

a reasonable time. Is it impossible to conceive that some philanthropist will come forward one day with a munificent donation for the same purpose ?

Gentlemen, before I resume my seat, may I make the following observation : The Indian Journal of Physics, as you are aware, acts as a *liaison* between the Indian Physical Society and the Indian Association for the Cultivation of Science. Is it impossible to conceive that the Journal of the Indian Chemical Society (or may I name it the Indian Journal of Chemistry) may serve in a similar manner as a *liaison* between the Indian Chemical Society and our Association ? I commend this to the consideration of those concerned and I hope that my suggestion will not be regarded as a fantastic one.

May our Association live and prosper.

6th March, 1943.

U. N. Brahmachari.

THE
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Annual Report for the Year 1942.

Report of the Committee of Management for the year 1942.

There has been an increase in the number of life members of the Association by 12 and of resident ordinary members by 25. The new life members have each contributed Rs. 250 to the Dr. Mahendra Lal Sircar Professorship Fund. The Association lost 2 of its life members through death. The total number of members at the end of the year was 157 of whom 122 were life members, 4 non-resident and 31 resident ordinary members. A revised list of members with addresses has been prepared.

2. ADMINISTRATION

Library. A sum of Rs. 1,900 was provided for in the budget estimates for 1942 under the head library, of which the sum of Rs. 1,259-6-6 was actually spent. Books and journals ordered for were not all received during the year and an additional sum of Rs. 1,000 has been allotted in the budget estimates for 1943 to meet outstanding bills. It has also been decided to ear-mark the unspent balance of the grant for the library for 1942 and a further sum of Rs. 2,500 for the purchase after the war of issues of journals which are not being received. It is proposed to allot further amounts in future years. These grants will be kept in a separate fund called the Library Reserve Fund.

3. REMOVAL OF BOOKS, JOURNALS & APPARATUS

Owing to present uncertain conditions, the Committee of Management at its meeting dated 26-3-42 decided to remove part of the library consisting of rare books and journals and some of the valuable apparatus to a safer place outside Calcutta and through the good offices of the President, Sir Upendra Nath Brahmachari, Kt., M.A., M.D., Ph. D., F.R.A.S.B., arrangements were made to keep them in the palace of the Maharaja of Nadia at Krishnagar.

A. R. P. Measures. Possible precautions against air raid such as baffle walls, barriers with sand bags have been taken with the advice of experts and a shelter room has been arranged. The A. R. P. organisation are using with the permission of the Committee of Management the lecture hall and the Honorary Secretary's rooms as A. R. P. Warden's Post.

Liquid Air Plant. At the request of the Officer Commanding No. 274 (b) Wing, R. A. F., the compressor of the liquid air plant has been lent to him through the Oxygen and Acetylene Co. of Calcutta. The plant was required for war purposes.

Mahendra Lal Sircar Professor. Leave without pay for 2 years was granted to Professor K. S. Krishnan, M. L. S. Professor of Physics to enable him to join the University of Allahabad as Professor of Physics ; later in September Professor Krishnan resigned his post. Attempts are being made to fill up the vacancy. Offers have been made to distinguished physicists, it is hoped that a final decision will be arrived at early in 1943.

Leave. Mr. Ashutosh De was granted leave with full pay for one year preparatory to retirement.

Mr. Akshayananda Bose, Research Assistant was granted leave for 8 months with effect from August 1, 1942 and Mr. Asutosh Mookherji, Research Fellow was appointed to act in his place.

Research Fellowship. Mr. Bhagawati Charan Guha was appointed a Special Research Fellow for one year from February, 1942.

Research Scholarship. Applications for research scholarships were as usual invited by advertisement at different parts of India. The following awards were made for the year 1942.

RESEARCH SCHOLARS

1. Mr. T. S. Anantapadmanabhan,
2. „ Ajit Kumar Dutta,
3. „ R. Gopalachari,
4. „ V. R. Ramanathan,
5. „ K. Krishnamurti,
6. „ Paresh Nath Das,

In addition to the above, the following gentlemen also worked in the laboratories without any remuneration from the Association.

1. Mr. S. L. Chorghade,
2. „ Satish Chandra Ganguly,
3. „ Haripada Chakravarty,
4. „ S. Balasundaram,
5. „ K. G. Krishnamurti,
6. „ B. V. Gokhle,
7. „ C. R. Dayal,
8. „ Md. Innas Ali,

PUBLICATIONS

Six issues of the Indian Journal of Physics and Proceedings of the Indian Association for the Cultivation of Science were published during the year. The following is a list of the papers which appeared in these issues.

*List of papers published in the Indian Journal of
Physics Vol. XV and XVI.*

Vol. XV Part VI.

	Page
34. X-ray Study of Selenium in the Liquid and Colloidal State by by K. Das Gupta and S. R. Das	401
35. Diffraction Pattern of Sulphuric Acid at Different Concentrations —By H. N. Bose	411
36. Vibrograph used as a Viscometer—By T. Tirunarayanachar ...	417
37. The Optical Hygrometer and its Working—By L. D. Mahajan ...	425
38. The Secondary K-absorption Spectra of Ferric Oxide in Solid and in Colloidal Solution—By S. Sen—	433
39. Studies in Antenna Resistance and Reactance—By S. R. Khast- gir	437
40. Application of the Theory of Random Scattering on the Intensity Variations of the Down-coming Wireless Waves over Long Transmission Paths—By M. M. Sen Gupta	447
41. Structure of the Electronic Bands of the OD Molecule, Part III— By M. G. Sastry	455

Vol. XVI Part I.

1. Propagation of Ultrasonic Waves in Liquid Mixtures and Inter- molecular Forces II—By Ram Prasad	1
2. On a Comparative Study of the Reflectivities of Aluminium and Silver Films—By M. V. Siva Ramakrishnan	12
3. Effect of Depth of Liquid on Damping of Quartz Oscillator—By K. G. Krishnan	23
4. Structure of the Electronic Bands of the OD Molecule, Part IV (Spin Doubling)—By M. G. Sastry	27
5. Band Spectrum of Bismuth Monochloride—By Santi Kumar Ray	35
6. The Velocity Gradient Method for the Measurement of Viscous Properties of Non-Newtonian Liquids—By J. N. Mukherjee... ..	49
7. Methods of Measuring Yield Value, Viscosity and Thixotropy— By J. N. Mukherjee	54
8. A Simple Rotary Viscometer for the Study of Anomalous Viscous Properties—By J. N. Mukherjee	66

Vol. XVI Part II.

	Page
9. Study of Electrolytic Dissociation in Iodic Acid by Raman Effect —By N. Rajeswara Rao	71
10. Propagation of Sound in Liquids and Viscosity—By G. Suryan ...	77
12. On Voltage Stabilizer Circuits—By B. Banerjee	87
13. Overall Voltage Gain of Low Frequency Amplifiers with Negative Resistance—By A. S. Rao	111
14. Fluid Flow Through Media. Part I. On the use of Gases for the Measurement of True Permeability—By N. C. Sen Gupta and M. G. Thein Nyun	119
15. Evidence for the Existence of Associated Mesons in Cosmic Ray Showers—By M. S. Sinha and R. L. Sen Gupta	129
16. Note on the Low Energy Scattering of Protons by Protons—By H. Mack Taxton	133

Vol. XVI Part III.

17. A new Audio-frequency Bridge—By L. M. Chatterjee ...	139
18. On the Volume and Surface Resistivities of Shellac Moulded Materials—By G. N. Bhattacharya	147
19. Thermal Conductivity of Liquid Metals—By M. Rama Rao ...	155
20. Thermal Conductivity of Liquids—By M. Rama Rao	161
21. Structure of the Electronic Bands of the OD Molecule, Part V. Λ -Doubling—By M. G. Sastry	169
22. Photometric Study of the Profiles of the Fraunhofer Lines in the Solar Spectrum. Part I. Mg. b. Group—By Y. Paramasiva Rao and C. K. Ananthasubrahmanyam	177
23. Proton-Proton Interaction and Yukawa Particle—By K. C. Kar ...	177
24. On the Theory of 'Q'-meter and its Corrections—By V. V. L. Rao	197

Vol. XVI Part IV.

25. Raman Frequencies of HDO—By Y. Paramasiva Rao ...	205
26. Polar Diagrams of Ultra-short Wave Horizontal Transmitting Aerials—By S. S. Banerjee and G. C. Neogi	211
27. The Linearity of the Mass-scale of Aston's Mass-Spectrograph— By J. B. Seth and C. V. H. Rao	219
28. On Effect of Resistance Component in Wave filter Elements and Performance of Non-ideal Filter Section—By Waquar Ahmed .	229
29. On the Thermal Conductivity of Indigenous Insulating Substances —By K. C. Niyogi and J. R. Basu Mallik	241
30. The Thermal Conductivity of Lac-moulding Compositions—By G. N. Bhattacharya	249
31. The effect of surrounding Medium on the Dielectric Strength of Lac and Lac-moulded Materials—By G. N. Bhattacharya	261

Vol. XV, Part V.

	Page
32. A note on the Principle of Adiabatic Invariance—By P. L. Bhatnagar and D. S. Kothari	271
33. The Motion of Gases in the Sun's Atmosphere, Part IV. On the Occurrence of Highly Stripped Atoms in the Corona—By A. K. Das and Y. P. Rao	277
34. The Structure of Atomic Nuclei—By M. F. Soonawala	291
35. Propagation of Supersonic Waves in Liquid Mixtures and Intermolecular Forces—Ether and Acetone in Chloroform—By Ram Parshad	307
36. On the Identification of Lines in the Solar Corona—By D. N. Kundu	317
37. Volume Rectification of Crystals—By B. K. Sen	329
38. Shunt Excited Broadcasting Antenna—By S. S. Bannerjee and S. Y. Tiwari	337
Errata	336

LIBRARY

Nineteen journals were subscribed and thirty-one journals and periodicals were received in exchange to the Indian Journal of Physics and Proceedings of the Indian Association for the Cultivation of Science. Thirty-two new books were purchased during the year. Journals and other publications received through subscriptions and in exchange of our publications are given in Appendix I.

FINANCIAL

The amounts which were due from the special funds at the beginning of the year and the adjustments made during the year are shown below :—

1. Victoria Professorship Fund.

	Rs.	As.	P.
Amount due to the General Fund at the close of last year	110	8	0
Amount paid by way of adjustment	51	0	0
	59	8	0

2. Hare Professorship Fund.

	Rs.	As.	P.
Amount due to the General Fund at the close of last year	109	8	0
Amount paid by way of adjustment	51	0	0
	58	8	0

It is to be noted that a sum of Rs. 1,13,699-4-9 was lent from the General Fund to create the Mahendra Lal Sircar Professorship Fund. The sum of Rs. 3,459-8 was transferred according to the decision of the Committee of Management to the General Fund out of the savings resulted from the vacancy in the Chair of the M. L. S. Professor. $3\frac{1}{2}\%$ Government Promissory Notes of the face value of Rs. 2,500/- were also purchased out of the cash balance of the Mahendra Lal Sircar Professorship Fund and added to the corpus of Dr. Mahendra Lal Sircar Memorial Fund.

Statement of accounts for the year 1942 and the budget estimates for 1943 are shown in the Appendix II.

EDUCATIONAL ACTIVITIES

As in the previous years a regular course of lectures in physics and chemistry were delivered at the lecture hall of the Association for the benefit of the Calcutta Medical Institute with our apparatus. Two of our research scholars rendered help as demonstrators.

Meteorological observations were as usual recorded and reports were issued to the following papers :—

1. The Amritabazar Patrika.
2. The Hindusthan Standard.
3. The Anandabazar Patrika.
4. The Jugantar.
5. The Advance.

Popular Lecture ;—During the year under review our President, Sir Upendra Nath Brahmachari, Kt., M.A., M.D., Ph.D., F.R.A.S.B., delivered a popular lecture on "A Research Worker's Struggle."

OBITUARY

The Association suffered great loss through the death of Messrs. M. N. Mukherji, B.E., Engineer and N. C. Roy, M.A., B.L., members of the Committee of Management from the year 1937 and 1917 respectively, and the Committee of Management recorded their appreciation of the services rendered by them to the Association.

8. ACKNOWLEDGMENT

The Committee of Management have great pleasure in recording grateful thanks to :—

- (a) The Government of India for their generous contribution of Rs. 18,000/- for the year 1942-43.
- (b) The University of Calcutta for printing the Indian Journal of Physics free of cost.
- (c) The Corporation of Calcutta for the exemption of Municipal taxes for Premises No. 210, Bowbazar Street (*i.e.*, the Lecture Hall and Laboratory buildings of the Association).

They also express their grateful appreciation of the honorary services rendered by—

- (a) Messrs. J. N. Basu, N. C. Chunder and J. C. Pal, as Trustees of the Association, and of Science Association Employees' Provident Fund.
- (b) Mr. K. C. Banerjee, B.E., C.E., on engineering matters,
- (c) Prof. J. N. Mukherjee, D.Sc., F.R.A.S.B., F.N.I., as Honorary Secretary of the Association.
- (d) Prof. P. N. Ghosh, M.A., Ph.D., Sc.D., F.N.I., Honorary Secretary, Editorial Board, Indian Journal of Physics and Proceedings of the Indian Association for the Cultivation of Science.
- (e) Messrs. B. N. Basu & Co. and G. C. Chunder & Co., on legal matters.
- (f) Mr. S. C. Sen, M.Sc., B.L.,

In presenting this report on behalf of the Committee of Management the Honorary Secretary places on record appreciation of the help received from the President and other members of the Committee of Management.

APPENDIX I

1. Journals Purchased

1. Philosophical Transactions of the Royal Society, A.
2. Scientific American.
3. Chemical Abstracts.
4. Journal of the American Chemical Society.
5. Journal of Physical Chemistry.
6. Nature.
7. Journal of the Chemical Society, London.
8. Physical Review.
9. Journal of Chemical Physics.
10. Philosophical Magazine,
11. Proceedings of the National Academy of Sciences, Washington.
12. Science Abstracts, A & B.
13. Proceedings of the Royal Society, A.
14. British Chemical Abstracts. Secs. AI, AII & AIII.
15. Transactions of the Faraday Society.
16. Journal of Applied Physics.
17. Reviews of Modern Physics.
18. Astrophysical Journal.
19. Proceedings of the Royal Institution of Great Britain:

2. Books Purchased

1. ✓ Introduction to Chemical Physics,—J. C. Slater.
2. ✓ Modern Physical Laboratory Practice,—John Strong.
3. ✓ High Voltage Physics,—L. Jacob.
4. ✓ Background to Modern Science,—Edited by Joseph Needham and Walter Pagel.
5. ✓ Practical Microscopical Metallography,—Richard Henry Greaves and Harold Wrighton.
6. The Earth's Magnetism,—S. Chapman.
7. ✓ Waves. A Mathematical Account of the Common Types of Wave Motion,—C. A. Coulson.
8. ✓ Science in Progress,—Baitsell.
9. ✗ The Fundamental Principles of Quantum Mechanics,—Edwin C. Kemble.
10. ✓ Proceedings of the Seventh Summer Conference on Spectroscopy and its applications from July 17-19, (1939).
11. ✓ Relativity Physics,—W. H. McCrea.
12. ✓ Cosmological Theory,—G. C. McVittie.
13. ✓ Molecular Beams,—Ronald Fraser.
14. ✓ The Identification of Molecular Spectra,—R. W. B. Pearse and A. G. Gaydon.
15. ✓ Electronic Structure and Chemical Binding,—Oscar Knefler Rice.

- ✓16. Infra-red and Raman Spectra,—G. B. B. M. Sutherland.
- ✓17. The Development of Mathematics,—E. T. Bell.
- ✓18. The Future in Education,—Sir Richard Livingstone.
- ✓19. The World and the Atom,—C. Moller and Ebbe Rasmussen.
- ✓20. Lord Rutherford,—Norman Feather.
- ✓21. The Quantum Theory of Radiation,—W. Heitler.
- ✓22. Structure of Atomic Nuclei and Nuclear Transformations,—G. Gamow.
- ✓23. The Stereographic Projection,—F. W. Sohon, S. J.
- ✓24. The Demonstration Laboratory of Physics at the University of Chicago,—Harvey B. Lemon and Fitz Hugh Marshall.
- ✓25. An Introduction to the Study of Stellar Structure,—S. Chandrasekhar.
- ✓26. Diffusion in and through Solids,—Richard M. Barrer.
- 27. Annual Reports on the Progress of Chemistry,—Vol. 37 (1940).
- 28. The Metallurgy of Deep Drawing and Pressing,—J. Dudley Jevons.
- 29. An Introduction to Astronomy,—Robert H. Baker.
- X30. Electrodynamics,—Leigh Page and Norman Ilsley Adams.
- 31. The Chemistry of Milk,—W. L. Davies.
- 32. Commercial Fruits and Vegetable Products,—Cruess.

3. List of Journals and Periodicals received in exchange of our Proceedings and Journal.

- 1. Biological Bulletin.
- 2. Bulletin of the Calcutta Mathematical Society.
- 3. Communications.
- 4. Comptes Rendu des Seances de la Societe de Physique D' Historie Naturelle de Geneve.
- 5. Current Science.
- 6. Journal of the Council for Scientific and Industrial Research.
- 7. Indian Journal of Agricultural Science.
- 8. Industrial and Engineering Chemistry.
- 9. Journal of the Royal Asiatic Society of Bengal.
- 10. Journal of the Franklin Institute.
- 11. Journal of the Indian Chemical Society.
- 12. Journal of Mathematics and Physics.
- 13. Journal of Research of the National Bureau of Standards.
- 14. Journal of Scientific Instruments.
- 15. Monthly Weather Review.
- 16. Proceedings of the Cambridge Philosophical Society.
- 17. Proceedings of the Indian Academy of Sciences, A & B.
- 18. Proceedings of the National Institute of Sciences of India.
- 19. Proceedings of the Physical Society.
- 20. Proceedings of the Royal Society of Edinburgh.
- 21. Proceedings of the University of Durham Philosophical Society.
- 22. Quarterly Journal of the Royal Meteorological Society.
- 23. Records of the Geological Survey of India.
- 24. Revue Trimestrielle Canadienne.
- 25. Science and Culture.
- 26. Terrestrial Magnetism and Atmospheric Electricity.
- 27. Transactions of the National Institute of Sciences of India.
- 28. University of Illinois Bulletin.
- 29. Iowa State College Journal of Science.
- 30. Journal of the Royal Aeronautical Society.
- 31. Revista De La Sociedad Mexicana De Historia Natural.

APPEN

INDIAN ASSOCIATION FOR

Receipts and Payments Account for the year

RECEIPTS	Rs. As. P.	Rs. As. P.
To Opening Balance as at 1. 1. 42.		
In hand (Imprest Cash)	165 0 0	
Imperial Bank of India (Current Account)	26,572 13 9	
(Savings)	10,565 12 3	
3% "G. P. Notes"	4,978 12 0	
Post Office Cash Certificate	8,460 0 0	
Fixed Deposit with Imperial Bank of India	2,000 0 0	52,742 6 0
.. Government of India Grant ... ..	...	18,000 0 0
.. Subscription from Members ... ..	...	442 0 0
.. Rents ... ..	...	4,993 14 0
.. Staff Income Tax ... ..	...	331 10 0
.. Indian Journal of Physics ... ..	...	862 2 0
.. Sale of Old Materials ... ..	...	11 1 0
.. Demonstration Allowance ... ..	...	700 0 0
.. Municipal Tax ... ..	...	650 10 6
.. Special Scholarship ... ..	...	260 0 0
.. Repayments from		
Mahendralal Sircar Prof. Fund	2,984 8 0	
Victoria Prof. Fund	51 0 0	
Hare Prof. Fund	51 0 0	3,086 8 0
.. Interest (General Fund) ... ..	...	573 10 0
.. Repayment from Veharilala Mitra & Mahendra Lal Sircar Prof. Fund ... ..	...	3,040 5 0
.. Repayment from Provident Fund A/c ... ..	...	22 0 0
.. Refund of Research Scholarship ... ..	...	81 11 0
.. Suspense ... ..	...	687 4 0
.. Provident Fund		
Contribution	1,794 10 0	
Interest	242 14 0	
Repayment of Loan	605 1 0	
Advance from General Fund	25 0 0	2,667 9 0
TOTAL Rs. ... ..	...	89,152 10 6

1-B, Old Post Office Street,
CALCUTTA,
16th February, 1943.

DIX II

THE CULTIVATION OF SCIENCE

ended 31st December, 1942

PAYMENTS				Rs. As. P.			Rs. As. P.				
By	Bank charges	...	...	...	...	13	6	0		
"	Office Establishment	...	...	...	...	2,495	13	0		
"	Contribution to Provident Fund (Association)	...	...	...	...	897	5	0		
"	Electric charges	...	...	...	...	485	2	0		
"	Gas charges	...	...	...	...	219	2	0		
"	Printing charges	...	...	...	...	188	1	3		
"	Library	...	...	...	...	1,262	0	3		
"	Staff Income Tax	...	...	...	...	331	10	0		
"	Telephone charges	...	...	...	...	223	7	0		
"	Research Establishment	...	...	...	...	12,325	10	6		
"	Indian Journal of Physics	...	...	...	...	3,093	3	0		
"	Office contingency	...	...	...	...	503	9	0		
"	Municipal Tax	...	...	...	...	1,025	14	0		
"	Building Repairs	...	...	...	...	2,315	9	0		
"	Workshop charges	...	...	...	...	194	11	6		
"	Laboratory contingency	...	...	...	...	124	2	6		
"	Laboratory charges	...	...	...	...	1,576	5	3		
"	Audit Fee	...	...	...	...	150	0	0		
"	Insurance	...	...	...	...	125	0	0		
"	Science Congress Ticket	...	...	...	...	10	0	0		
"	Donation	...	...	...	...	100	0	0		
"	Postage	...	...	...	...	66	1	3		
"	Travelling Allowance	...	...	...	...	134	1	6		
"	Special Scholarship	...	...	...	...	260	0	0		
"	Miscellaneous	...	...	...	...	32	8	0		
"	Refund of Library Deposit	...	...	...	...	10	0	0		
"	Renovation of Electric Wiring	...	...	...	...	501	15	9		
"	Laboratory Building Repairs	...	...	...	...	4,902	7	0		
"	War Emergency	...	...	...	...	1,908	15	0		
"	Suspense	...	...	...	...	474	8	0		
"	Advance to Veharilala Mitra and Mahendra Lal Sircar Prof. Fund	...	...	...	...	3,040	5	0		
"	Refund of Subscription (Membership)	...	...	...	...	7	0	0		
"	Provident Fund—										
	Insurance Premium	...	...	...	176	14	0			
	Loan to Staff	...	...	...	220	0	0			
	Repayment to Fund General	...	...	...	47	0	0			
	Withdrawal of Mr. A. T. Dey	6,937	6	6		7,381	4	6
"	Closing Balances—										
	Imprest cash	...	...	...	15	0	0			
	Imperial Bank of India (Current)	...	...	...	21,538	3	6			
	" " (Savings)	...	...	...	5,781	9	9			
	3% G. P. Notes (cost)	...	...	...	4,978	12	0			
	P. O. Cash Certificate (cost)	...	...	...	8,460	0	0			
	Fixed Deposit with Imperial Bank of India	2,000	0	0		42,773	9	3
	TOTAL Rs.	89,152	10	6

Examined and found correct,
S. N. Mukherji, F.S.A.A., R.A
Incorporated Accountant

THE CULTIVATION OF SCIENCE

31st December, 1942

ASSETS				Rs. As. P.		Rs. As. P.	
Land and Building	...	...	...	...	31,680	11	9
Lecture Hall and Gallery	...	...	...	...	23,465	5	3
Vizianagram Laboratory	...	...	...	...	40,900	14	0
Observatory room	...	...	...	...	3,320	9	9
Range of Shops (east)	...	...	...	...	2,516	10	9
" " (west)	...	...	...	...	2,308	5	0
Servants' quarters	...	...	...	...	303	13	9
Durwan's quarter	...	...	...	...	1,024	0	0
Scientific Instruments	...	...	...	...	1,21,906	0	11
Botanical Instruments	...	...	...	...	2,329	6	0
Workshop Instruments	...	...	...	...	9,861	5	9
Tools and Implements	...	...	...	...	225	7	3
Furniture	...	...	...	...	19,666	14	6
Library	...	...	...	...	71,496	12	1
Investments in G. P. Notes (Face Value)							
Mahendralal Sircar Prof. Fund	...	...	...	1,48,500	0	0	
Veharilala Mitra Fund	...	...	...	1,32,000	0	0	
General Fund	...	...	...	16,500	0	0	
Coochbehar Prof. Fund	...	...	...	33,000	0	0	
Joykissen Mukherjee Medal Fund	...	...	...	13,400	0	0	
Ripon Professorship Fund	...	...	...	25,000	0	0	
Building Fund	...	...	...	9,500	0	0	
Dr. Sircar Research Medal Fund	...	...	...	5,000	0	0	
Victoria Professorship Fund	...	...	...	1,500	0	0	
Hare Professorship Fund	...	...	...	1,500	0	0	
Nikunja Garabini Prize Fund	...	...	...	1,000	0	0	
Woodburn Medal Fund	...	...	...	1,500	0	0	
Jatindra Chandra Prize Fund	...	...	...	1,000	0	0	
					3,89,400	0	0
Imperial Bank of India (Current a/c of Special Funds)				...	7,917	5	4
Advance to Special Fund :							
Victoria Prof. Fund	...	...	...	59	8	0	
Hare Prof. Fund	...	...	...	58	8	0	
					118	0	0
Fluctuation on Investment A/c : Being the difference of face and market value of Securities	...	...	...	...	324	1	0
Employees' Provident Fund Investments (at cost) :							
Postal cash certificates	...	...	...	8,460	0	0	
Imperial Bank of India (savings)	...	...	...	5,781	9	9	
3% G. P. Notes (face value Rs 5,000)	...	...	...	4,978	12	0	
Fixed Deposit (Imperial Bank of India)	...	...	...	2,000	0	0	
					21,220	5	9
Suspense Account :							
In hand (imprest)	...	...	...	15	0	0	
Closing balances	...	...	...	...	22	4	0
Imperial Bank of India, current A/c	...	...	...	21,538	3	6	21,553 3 6
TOTAL				...	7,71,561	8	4

for the Cultivation of Science set forth above with the Books and Vouchers of the correct view of the state of Association's affairs, according to the best of my information and

S. N. Mukherji, F.S.A.A., R.A.,
Registered Accountant.

INDIAN ASSOCIATION FOR

General Fund Account for the year

INCOME			Rs. As. P.	Rs. As. P.
Fund at the beginning of the year	...	...	...	2,13,93 154 0
Government of India Grant	...	...	...	23,935 14 3
Subscriptions	...	...	...	442 0 0
Rent	...	...	...	4,993 14 0
Income-Tax	...	...	...	331 10 0
Indian Journal of Physics	...	...	...	862 2 0
Sale of Old Materials	...	...	...	11 1 0
Demonstration Allowance	...	...	...	700 0 0
Municipal Tax	...	...	...	650 10 6
Special Scholarship	...	...	...	260 0 0
Interest of General Fund	...	...	...	573 10 0
Refund of Research Scholarship	...	...	...	81 11 0
Repayment from Mahendralal Prof. Fund	...	...	...	2,984 8 0
Opening Balance as on 1-1-42	...	...	16,423 2 0	
Amount received in 1942 (1942-43)	...	...	18,000 0 0	
Less, Appropriation in 1942—			34,423 2 0	
Provident Fund Contribution of				
Prof. Krishnan	Rs.	77 14 0		
Electric charges	..	485 2 0		
Gas charges	..	219 2 0		
Telephone charges	..	223 7 0		
Research Establishment...	..	12,825 10 6		
Library	..	1,262 0 3		
Laboratory charges	..	1,576 5 3		
Laboratory contingency...	..	124 2 6		
Laboratory Building Repairs	..	4,902 7 0		
Travelling Allowance	..	134 1 6		
Workshop Charges	..	194 11 6		
Renovation of Electric Wiring	..	501 15 9		
War Emergency	..	1,908 15 0	23,935 14 3	
Balance Carried Over to Balance Sheet	...	...	10,487 3 9	
	TOTAL	...	...	2,49,761 15 9

THE CULTIVATION OF SCIENCE

ended 31st Decemher, 1942.

OUTGO				Rs. As. P.	Rs. As. P.
Bank Charges	13 6 0
Office Establishment	2,495 13 0
Provident Fund Contribution	897 5 0
Electric Charges	485 2 0
Gas Charges	219 2 0
Printing Charges	188 1 3
Income-Tax	331 10 0
Telephone Charges	223 7 0
Research Establishment	12,325 10 6
Indian Journal of Physics	3,093 3 0
Office Contingency	503 9 0
Laboratory Charges	1,576 5 3
Municipal Tax	1,025 14 0
Laboratory Contingency	124 2 6
Laboratory Building Repairs	4,902 7 0
Workshop Charges	194 11 6
Audit Fee	150 0 0
Insurance	125 0 0
Science Congress Ticket	10 0 0
Donation	100 0 0
Postages	66 1 3
Travelling	134 1 6
Special Scholarship	260 0 0
Miscellaneous Charges	32 8 0
Building Repairs	2,315 9 0
Renovation of Electric Wiring	501 15 9
War Emergency Expenses	1,908 15 0
Refund of Subscription	7 0 0
Fund at Close	2,15,551 0 3
TOTAL Rs.				...	2,49,761 15 9

Examined and found correct,
S. N. Mukherji, F.S.A.A., R.A.,
Incorporated Accountant.

INDIAN ASSOCIATION FOR

Receipts and Payments account of

RECEIPTS	Rs. As. P.	Rs. As. P.
Opening Balance as at 1-1-42	...	2,455 12 11
1. Ripon Prof. Fund		
Interest ... ..	...	812 4 0
2. Dr. Sircar Research Medal Fund		
Interest ... ..	...	171 2 0
3. Nikunja Garabini Prize Fund		
Interest ... ..	...	35 0 0
4. Woodburn Medal Fund		
Interest ... ..	...	52 8 0
5. Jatindra Ch. Prize Fund		
Interest ... ..	...	35 0 0
6. Joykissen Mookerjee Medal Fund		
Interest	447 10 0	
Special Publication	1 5 0	448 15 0
7. Victoria Professorship Fund		
Interest ... ..	...	52 8 0
8. Coochbehar Prof. Fund		
Interest	1,104 8 0	
Special Publication	3 12 0	1,108 4 0
9. Hare Prof. Fund		
Interest ... ..	...	52 8 0
10. Building Fund		
Interest ... ..	...	311 2 0
11. Mahendra Lal Sircar Prof. Fund		
Interest	5,145 0 0	
Subscription	3,075 8 0	
		8,220 8 0
12. Veharilala Mitra Fund		
Life-membership Interest ... ..	...	4,620 0 0
TOTAL Rs. ... ..	...	18,375 7 11

1-B, Old Post Office Street,

CALCUTTA.

16th February, 1943.

THE CULTIVATION OF SCIENCE

Special Funds for the year 1942

PAYMENT					Rs.	As.	P.	Rs.	As.	P.
1. Ripon Professorship Fund										
Commission	...	...	...	...	16	0	0			
Cost of Govt. Securities	3½%	Face Value of			948	7	10			
Rs. 1000/-	...	...	...	...				964	7	10
2. Dr. Sircar Research Medal Fund										
Commission	...	...	...	...	...			3	8	0
3. Nikunja Garabini Prize Fund										
Commission	...	...	...	...	...			1	8	0
4. Woodburn Medal Fund										
Commission	...	...	...	...	...			2	0	0
5. Jatindra Ch. Prize Fund										
Commission	...	...	...	...	...			2	0	0
6. Joykissen Mookerjee Medal Fund										
Commission	...	...	...	...	8	2	0			
Cost of Govt. Securities	...	...	...	...	467	9	0			
7. Victoria Prof. Fund										
Commission	...	...	...	...	2	0	0			
Repayment to General Fund	...	...	...	...	51	0	0			
8. Coochbehar Prof. Fund										
Commission	...	...	...	...	16	8	0			
Cost of 3½% G. P. Notes	...	...	...	...	935	1	6			
9. Hare Prof. Fund										
Commission	...	...	...	...	1	8	0			
Repayment to General Fund	...	...	...	...	51	0	0			
10. Building Fund										
Commission	...	...	...	...	6	4	0			
Cost of 3½% G. P. Notes	...	...	...	...	467	9	0			
11. Mahendra Lal Sircar Prof. Fund										
Commission	...	...	...	...	27	4	0			
Salary of M. L. S. Prof. for 1942	...	...	...	...	878	10	0			
Repayment to General Fund	...	...	...	...	2,984	8	0			
Cost of 3½% G. P. Notes	...	...	...	...	1,402	10	3			
12. Veharilala Mitra Fund										
Commission	...	...	...	...	22	12	0			
Salary of M. L. S. Prof. for 1942	...	...	...	...	2,162	4	0			
Closing Balance as at 31.12.42	...	...	...	...	...			2,185	0	0
								7,917	5	4
TOTAL Rs.										
								18,375	7	11

Examined and found correct
 S. N. Mukherji, F.S.A.A., R.A.,
 Incorporated Accountant.

INDIAN ASSOCIATION FOR

EMPLOYEES'

Balance Sheet as at

LIABILITIES				Rs. As. P.	Rs. As. P.
Prof. K. S. Krishnan	...	...	...	...	14,170 14 2
Ashutosh Dey	...	...	...	...	1,281 3 6
Nalinaksha Sinha	...	...	...	...	3,261 4 10
Sachi Nath Banerjee	...	...	...	...	459 12 2
Dhirendra Nath Das	...	...	...	...	2,574 12 9
Subodh K. Chakravarty	...	...	...	...	7 4 6
Haran K. Chackravarty	...	...	...	...	131 7 10
Satish Chandra Das	...	...	...	...	1,510 1 2
Dwija Pado Roy	...	...	...	...	258 8 1
Harakali Mukherjee	...	...	...	...	184 0 8
Gour Gopal Das	...	...	...	...	62 5 6
B. M. Bhattacharya	...	...	...	...	13 12 9
Interest Undistributed	...	...	...	...	30 7 10
				TOTAL	23,945 15 9

1-B, Old Post Office Street,
CALCUTTA,
The 16th February, 1943.

THE CULTIVATION OF SCIENCE

PROVIDENT FUND

31st December, 1942

ASSETS	Rs. As. P.	Rs. As. P.
Loans		
Prof. K. S. Krishnan on account of Premium of Life Assurance	2,486 0 0
Sachi Nath Banerjee	85 8 0
Satish Ch. Das	6 4 0
Dwija Pado Roy	64 2 0
Harakali Mukherjee	13 5 0
Other Investments		
3% G. P. Notes (Face Value Rs. 5,000/-Cost)	4,978 12 0
Postal Cash Certificates	8,460 0 0
Fixed Deposit	2,000 0 0
Imperial Bank of India, Savings Account	5,781 9 9
Suspense	70 7 0
TOTAL Rs.	23,945 15 9

Examined and found correct
S. N. Mukherjee, F.S.A.A., R.A.,
Incorporated Accountant.

APPENDIX III

Office Bearers and Members of the Committee of Management For the year, 1942.

President

Sir U. N. Brahmachari, Kt., M.A., M.D., Ph.D., F.R.A.S.B., F.N.I.

Vice-Presidents

1. J. N. Basu, Esq., M.A., M.L.A.,
6, Old Post Office Street Calcutta.
2. Prof S. K. Mitra, M.B.E., D.Sc., F.N.I.,
92, Upper Circular Road, Calcutta.
3. Dr. S. P. Mookerjee, M.A., B.L., D.Litt., Bar-at-Law.,
77, Asutosh Mookerjee Road, Bhowanipore, Calcutta.
4. Prof. M. N. Saha, D.Sc., F.R.S., F.N.I., F.R.A.S.B.
92, Upper Circular Road, Calcutta.
5. Rao Bahadur B. Venkatesachar, M.A.,
"Ambica Vilas", Bull Temple Road,
Basavangudi, Bangalore.

Members

1. S. K. Banerjee, D.Sc., F.N.I.,
Meteorological Office, Poona.
2. The Hon'ble Mr. Justice C. C. Biswas, C.I.E., M.A., B.L.,
58, Puddopuker Road, Bhowanipore, Calcutta.
3. Capt. N. Datta, M.B.,
153, Dhurumtollah Street, Calcutta.
4. Sir J. C. Ghosh, Kt., D.Sc., F.N.I.,
Director, Indian Institute of Science, Bangalore.
5. Sir M. O. Forster, Kt., D.Sc., Ph.D., Sc.D., F.N.I.,
Old Banni Mantap Mysore City.
6. Prof. P. N. Ghosh, M.A., Ph.D., Sc.D., F.N.I.,
92, Upper Circular Road, Calcutta.
7. Prof D. M. Bose, M.A., Ph.D., F.N.I.,
Bose-Institute, 93/1, Upper Circular Road, Calcutta.
8. Dr. B. S. Guha, D.Sc., F.N.I.,
Indian Museum, Calcutta.
9. Dr. S. N. Ray, M.B., F.R.C.S.,
34, Allenby Road, Bhowanipur, Calcutta.
10. Dr. W. A. Jenkins, C.I.E., D.Sc., I.E.S., Nominee of the Govt. of
India,

11. Prof. K. S. Krishnan, D.Sc., F.R.S., F.N.I., University of Allahabad, Allahabad, M.L.S., Professor of Physics (Ex-officio).
12. J. M. Majumdar, Esq., M.A.,
1, Chowringhee Terrace, Calcutta.
13. Prof. J. N. Mukherjee, D.Sc., F.R.A.S.B., F.N.I., Honorary Secretary (Ex-Officio), 92, Upper Circular Road, Calcutta.
14. Mr. K. C. Banerjee, B.E., C.E.,
12, Old Post Office Street, Calcutta.
15. Prof. H. K. Mookerjee, D.Sc., F.N.I.,
35, Ballygunge Circular Road, Calcutta.
16. J. C. Pal, Esq., M.A., B.L.,
16, Komedan Bagan Lane, Calcutta.
17. Mr. N. K. Majumdar, Esq., M.A., G.D.A., R.A.,
Registrar, Joint Stock Companies, Calcutta.
18. S. C. Sen, Esq., M.Sc., B.L.,
6, Old Post Office Street, Calcutta.
19. Dr. C. M. Sogani, D.Sc.,
Benares Hindu University, Benares.
20. Dr. N. K. Sethi, D.Sc.,
Agra College, Agra.
21. Prof. S. Bhagavantam, D.Sc., (Hon.)
Andhra University, Waltair.

APPENDIX IV

List of Joy Kissen Mookerjee Medallists, Ripon and Coochbehar Professors since the separation of the endowed funds :—

JOY KISSEN MOOKHERJEE MEDALLISTS

1. Sir E. J. Russell, D.Sc., F.R.S. ... 1936
2. Sir James H. Jeans, D.Sc., Sc D., LL.D., F.I.C., F.R.S. ... 1937
3. Professor F. W. Aston, F. R. S., D.Sc., Nobel Laureate ... 1938
4. Professor Robert A. Millikan, D.Sc., Nobel Laureate ... 1939

RIPON PROFESSORS

1. Sir Lewis Leigh Fermor, O.B.E., D.Sc., F.R.S. ... 1937
2. Sir Arthur W. Hill, K.C.M.G., Sc.D., F.R.S. ... 1938

COOCHBEHAR PROFESSORS

1. Professor J. E. Lennard-Jones, D.Sc., F.R.S. ... 1938

APPENDIX II
INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE
BUDGET ESTIMATES FOR THE YEAR 1943

Receipts

Expenditure

ACCOUNTS	Actuals 1940		Actuals 1941		Revised Budget for 1942		Actuals 1942		Budget for 1943		ACCOUNTS	Actuals 1940		Actuals 1941		Revised Budget for 1942		Actuals 1942		Budget Estimate for 1943			
	Rs.	As. P.	Rs.	As. P.	Rs.	As. P.	Rs.	As. P.	Rs.	As. P.		Rs.	As. P.	Rs.	As. P.	Rs.	As. P.	Rs.	As. P.	Rs.	As. P.	Rs.	As. P.
Membership Fees																							
Life	3,075	8 0	3,075	8 0	1,000	0 0	I. Staff—Research Department—												
Ordinary	105	0 0	110	0 0	432	0 0	442	0 0	440	0 0	(a) M. L. S. Prof. 1,000(1)	12,000											
Indian Journal of Physics											(b) Research Fellow 125(1)	1,500											
Reprints	117	0 0	63	0 0	60	0 0	60	0 0	(c) Research Assistant 160(1)	1,920											
Subscriptions	1,363	10 7	14,99	11 0	850	0 0	862	2 0	850	0 0	(d) Research Scholars 75(4), 50(2)	4,800											
Physical Society	660	0 0	630	0 0	660	0 0	1,320	0 0 ¹	(e) Demonstrator 205(1) x4	820											
Advertisement	36	0 0	16	4 0	(f) Library Attendant 27(1)	324											
Rent	5,625	7 0	5,426	8 0	4,770	14 6	4,993	14 0	4,070	4 0 ²	(g) Laboratory Attendant 23(1)	276											
Selami	31	0 0		21,640	19,386	10 6	21,607	10 3	13,500	0 0	15,365	15 6	24,688	0 0	
Demonstration Allowance	700	0 0	450	0 0	700	0 0	700	0 0	600	0 0	2. Workshop—												
Sale of Old Materials	10	6 6	67	7 0	11	0 0	11	1 0	10	0 0	Mechanics 90(1), 56(1), 30(1), (25(1)	2,412											
Staff Income-Tax	416	2 0	773	1 0	331	10 0	331	10 0	25	2 0	Peon 19(1)	228											
Interest											War Allowance	408											
Veharilala Mitra Fund & Mahendra Lal Sircar Professorship Fund	9,765	8 0	9,765	0 0	9,765	0 0	9,765	0 0	9,852	8 0	3. Equipment and working expenses of laboratories—												
General Fund	735	0 0	678	0 0	573	10 0	573	10 0	577	8 0	Special Apparatus	4,165	12 0	2,929	4 3	1,600	0 0	1,576	5 3	2,000	0 0		
Government of India Grant	18,000	0 0	18,000	0 0	18,000	0 0	18,000	0 0	18,000	0 0	Renovation of Electric Wiring											
Municipal Tax (Occupiers' share)	371	11 0	335	7 6	691	7 0	650	10 6 ⁴	489	6 0	Provision for Chemical Apparatus											
Special Scholarship	325	0 0	260	0 0	Renovation of Laboratories											
Rent Deposit	62	0 0	Equipment of Chemical Laboratory											
Library Deposit	20	0 0	10	0 0	Repairs of Laboratory Buildings											
Amount received from Special Fund	699	12 0	135	12 10	Repair of Electric Fittings											
Miscellaneous Receipts	81	11 0	Epidiascope											
Suspense	125	0 0	...	...	...	...	687	4 0	...	...	General Equipment & contingent expenses	689	2 6	814	5 6	125	0 0	124	2 6	700	0 0
Repayment from Provident Fund A/c ... ..	...	...	42	14 0	...	...	22	0 0	...	...	Workshop (recurring)	523	3 0	627	6 3	185	0 0	194	11 6	250	0 0
Add proceeds from Transfer to Government Securities to different funds ... ..	...	...	4,291	14 0	...	...	...	...	...	...	Gas	296	15 0	315	3 0	220	0 0	219	2 0	300	0 0
Repayment in part from M. L. S. Professorship Fund to General Fund ... ..	...	...	...	...	3,459	8 0	2,984	8 0	...	...	Electricity	516	0 0	830	10 0	500	0 0	485	2 0	700	0 0
Repayment in part from Special Fund to General Fund	102	0 0	4. Office Establishment—												
Opening Balance	38,843	9 1	42,619	15 4	43,377	9 0	43,542	14 6	37,294	12 0	Ministerial Staff : 100(1), 38(1)	1,656											
	25,960	9 1	27,387	4 5	27,387	4 5	26,928	12 9	26,928	12 9	Menials 20(1), 15(1), 14(1)	588											
	64,804	2 2	70,007	3 9	71,764	13 5	70,471	11 3	64,223	8 9	Dearness Allowance	372											
											Cycle Allowance	12											
											5. General—												
											Telephone	211	10 0	225	2 0	223	0 0	223	7 0	200	0 0		
											Postage	30	7 6	42	5 0	67	0 0	66	1 3	80	0 0		
											Printing	223	15 0	162	8 0	180	0 0	188	1 3	150	0 0		
											Audit Fee	150	0 0	150	0 0	150	0 0	150	0 0	150	0 0		
											Insurance	125	0 0	125	0 0	125	0 0	125	0 0	125	0 0		
											Office stationery & contingency	729	12 0	244	7 6	250	0 0	254	0 0 ⁷	150	0 0		
											Bank charges	6	12 0	13	10 0	13	0 0	13	6 0	13	0 0		
											Bank charges for Veharilala Mitra and M. L. S. Professorship Fund	26	8 0	26	0 0	26	0 0	50	0 0	26	0 0		
											Staff Income-tax	416	0 0	773	1 0	261	13 0	331	10 0	25	12 0		
											Provision for paper for Annual Report ... ..	...	...	180	0 0	...	...	...	...	...	...
											Provision for paper & stationery consumption ... ..	...	...	250	0 0	249	9 0	...	...	...	...
											6. Contribution to Provident Fund—												
											Indian Journal of Physics—												
											Provision for paper	1,291	1 0	1,502	4 0	942	4 0	897	5 0	1,432	4 0		
											8. Library—												
											Journals	1,539	9 0	1,546	7 0	1,260	0 0	1,262	0 3	3,675	0 0 ⁸		
											Books ... ..	...	...	...	...	...	...	1,200	0 0		
											Binding ... ..	...	...	...	...	...	...	500	0 0		
											9. Municipal Tax	779	10 0	779	10 0	1,026	0 0	1,025	14 0	1,026	0 0		
											Contribution to Science News Association	100	0 0	100	0 0	100	0 0	100	0 0	100	0 0		
											Travelling Allowance	171	6 0	45	3 6	135	0 0	134	1 6	100	0 0		
											Advertisement	24	2 0	14	0 0	17	0 0	20	0 0	20	0 0		
											Furniture	40	0 0	190	4 0	40	0 0	...	...	40	0 0
											Miscellaneous Repairs	362	6 6	435	11 0	...	...	...	...	...	...
											Miscellaneous Arrangements ... ..	...	...	295	11 0	36	8 0	32	8 0	100	0 0
											Special Scholarships ... ..	...	...	325	0 0	260	0 0	260	0 0	...	...
											Library Deposit	10	0 0	...	...	...	...	10	0 0	...	...
											Advance to Special Funds	410	0 0	...	...	...	...	...	...	...	...
											Repayment Special Funds	324	0 0	...	...	...	...	...	...	...	...
											Science Congress ticket	10	0 0	10	0 0	10	0 0	10	0 0	10	0 0		
											Advance to Provident Fund ... ..	...	...	22	0 0	...	...	...	...	...	...
											Suspense	167	14 0	235	0 0	...	...	474	8 0	...	...
											23. Refund of Subscription ... ..	...	...	...	...	...	...	7	0 0	...	...
											War Emergency :												
											Baffle Wall ... ..	...	...	519	0 0	519	0 0	...	...	...	...
											Sand & sand bags ... ..	...	...	68	4 6	68	4 6	...	...	...	...
											Packing and cost of sending Apparatus to Krishnagar ... ..	...	...	988	8 6	1,033	6 6	...	...	...	...
											Railway freight ... ..	...	...	35	1 0	35	1 0	...	...	...	...
											Covering glass panes with cloth ... ..	...	...	253	3 0	253	3 0	...	...	...	...
											Investment of life-membership fees A/c, M. L. S. Sircar Professorship Fund etc. ... ..	...	...	2,367	12 3	1,402	10 3	...	...	...	...
											Amount transferred to General Fund ... ..	...	...	...	...	...	...	...	...	...	...
											On account of advance to M. L. S. Prof. Fund :												
											By adjustment ... ..	...	...	2,300	8 0	...	...	...	...	...	...
											By transfer ... ..	...	...	1,159	0 0	2,984	8 0	...	...	...	...
											Closing balance	37,416	13 9	43,148	14 0	42,306	11 0	43,434	15 0	48,209	0 0		
											TOTAL Rs. ...	64,804	2 2	70,007	3 9	66,880	1 3	70,471	11 3	64,223	8 9		

BANI PRESS, CALCUTTA