For Members only

Proceedings

OF THE 30th MEETING OF THE

Board of Scientific & Industrial Research

MARCH 10, 1953

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH, NEW DELHI

LIST OF RESEARCH COMMITTEES OF THE B.S.I.R. AND THEIR CHAIRMEN.

1.	Physical Research Committee.	Chairman	Dr. C.V. Raman, F.R.S., N.L.
2.	Radio Research Committee.	,,	Dr. K.S. Krishnan, F.R.S.
3.	Atmospheric Research Committee.	,,	Mr. V.V. Sohoni, F.N.I.
4.	High Altitude Research Sub-Committee.	,,	Mr. V.V. Sohoni, F.N.I.
5.	Committee on the Measurement of Geological Time in India.	,,	Dr. D.N Wadia, F.N.I.
6.	Statistics, Standards and Quality Control Committee.	,,	Prof. P.C. Mahalanobis, F.R.S.
7.	Building Research Committee.	,,	Sardar Teja Singh Malik.
8.	Internal Combustion Engines Research Committee.	,,	Dr. J.C. Ghosh, F.N.I.
9.	Chemical Research Committee.	,,	Dr. K. Venkataraman.
10.	Pharmaceuticals and Drugs Research Committee.	,,	Col. R.N. Chopra, F.N.I.
11.	Malaria Chemotherapy Sub-Committee.	,,	Col. R.N. Chopra, F.N.I.
12.	Bio-chemical Research Committee.	,,	Dr. M. Damodaran.
13.	Mining Research Committee.	Convenor	Dr. J.W. Whitaker.
14.	Fuel Research Committee.	Chairman	Dr. J.W. Whitaker.
15.	Coal Blending and Coking Research Sub-Committee.	,,	Mr. S.K. Nanavati.
16.	Glass and Refractories Research Committee.	,,	Dr. D.N. Wadia, F.N.I.
17.	Salt Research Committee.	,,	Dr. Mata Prasad, F.N.I.
18.	Essential Oils Research Committee.	,,	Mr. A.K. Menon.
19.	Vegetable Oils Research Committee.	,,	Prof. T.R. Seshadri.
20.	Vanaspati Research Advisory Committee.	,,	Dr. S.S. Bhatnagar, F.R.S.
21.	Metals Research Committee	,,	Mr. J.J. Ghandy.
22.	Plastics Research Committee	,,	Dr. L.C. Verman, F.N.I.
23.	Cellulose Research Committee.	,,	Dr. Lavji Thoria.
24.	Leather Research Committee.	,,	Mr. B.M. Das.

COMMITTEE OF THE BOARD OF SCIENTIFIC & INDUSTRIAL RESEARCH.

A meeting of the Committee of the Board was held at 9-30 a.m. on Monday the 9th March 1953 in New Delhi. The following were present :—

Lala Shri Ram	(in the Chair)
Dr. S.S. Bhatnagar	(D.S.I.R.)
Dr. J.C. Ghosh	Member.
Dr. H.J. Bhabha	,,
Mr. J.J. Ghandy	,,
Dr. K.A. Hamied	,,
Dr. J.N. Mukherjee	,,
Dr. K.S. Krishnan	,,
Dr. D.N. Wadia	,,
Mr. R.P. Bahadur	(Secretary, C.S.I.R.)

The Agenda for the 30th meeting of the Board of Scientific and Industrial Research was discussed and recommendations made.

BOARD OF SCIENTIFIC AND INDUSTRIAL RESEARCH.

The 30th meeting of the Board of Scientific and Industrial Research was held in the Conference Hall of the C.S.I.R. Buildings, New Delhi at 10-00 A.M. on the 10th March 1953. Shri Jawaharlal Nehru presided and the following members were present :—

1.	Maulana Abul Kalam Azad	(Vice-President, C.S.I.R.)
2.	Dr. S.S. Bhatnagar	(D.S.I.R.)
3.	Dr. K.S. Krishnan.	
4.	Shri A. Ramaswami Mudaliar.	
5.	Dr. J.C. Ghosh.	
6.	Shri Kasturbhai Lalbhai.	
7.	Prof. M.N. Saha.	
8.	Lala Shri Ram.	
9.	Dr. K.A. Hamied.	
10.	Shri J.J. Ghandy.	
11.	Dr. H.J. Bhabha.	
12.	Dr. D.N. Wadia.	
13.	Dr. J.N. Mukherjee.	
14.	Shri R.P. Bahadur	(Secretary, C.S.I.R.)

The President referred to the sad demise of S. Teja Singh Malik, Chairman of the Building Research Committee and Chairman of the Local Planning Committee of the Central Building Research Institute. He also informed the members that the Coal Board had agreed to contribute a sum of Rs. 5 lakhs towards pilot plant work in the Fuel Research Institute.

The Board considered the recommendations of the Committee of the Board on the various

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Proceedings of the XXX meeting of the Board of Scientific and Industrial Research held on the 10th March, 1953.

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RESEARCH SCHEMES

Item No.	*Particulars*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
I	Confirmation of the proceedings of the 29th meeting of the Board of Scientific and Industrial Research held on the 12th August, 1952.	I. p. 1. The Committee noted that proceedings of the 29th meeting of the B.S.I.R. held on the 12th August 1952 had already been circulated to the members and no member had raised any point which required reconsideration. The Committee, therefore, recommend that proceedings of the 29th meeting of the B.S.I.R. be confirmed.	I. p. 1. The Board noted that proceedings of the 29th meeting of the B.S.I.R. held on the 12th August 1952 had already been circulated to the members and no member had raised any point which required reconsideration. The Board, therefore, confirmed the proceedings of the 29th meeting held on the 12th August 1952.
II	*Subject:* **Thermal Diffusion and Inter-Diffusion of Gases by Dr. B.N. Srivastava, Reader in Physics, Lucknow University, Lucknow.** *Object:* The object of the scheme is to derive the laws of molecular interaction and to construct with the help of information gained a thermal diffusion column for preparing isotopes for use in the laboratory and other purposes. Sufficient work on the subject had been done in U.S.A., but information available is scanty due to secrecy regulations. *Author's record:* Dr. Srivastava has published some theoretical papers on the subject. Experimental work has been planned and some simple apparatus constructed but work is held up due to lack of funds. *Duration:* The scheme is expected to take three years for completion. *Grant asked for:* Equipment ... Rs. 9,000 (Thermal diffusion column, pumps, ionization guage, apparatus for gas analysis, electric furnace etc. Purchase to be spread over two years). Contingencies ... Rs. 3,000 Staff ... Rs. 9,000 (including allowances) (One Senior Research Asst. Rs. 250 25-500. One Junior Research Asst. Rs. 160-10-330. One Lab Asst. cum mechanic Rs. 100). Total Rs. 21,000 (including allowances) *Research Committee's recommendation:* The Physical Research Committee considered the scheme in its meeting held on		

RESEARCH SCHEMES

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	17th December, 1952 and was of the opinion that *only the first item in the programme of research outlined could usefully be undertaken, e.g. to discover the laws of molecular interaction by experiments on inter-diffusion and thermal diffusion. Accordingly, the proposer may confine himself to the above objective; the appointment of one J.R.A. and a sum of Rs.* 1,000 *as a contingent grant was recommended* (*Vide* Proceedings of the Physical Research Committee under Item No. XXXVII.2 (*iv*) page 97 of this agenda).	II p 1-3. The Committee recommended that the Research Scheme on Thermal Diffusion & Interdiffusion of Gases by Dr. Srivastava be approved and the following grant be made : Equipment Nil Contingencies Rs. 1,000 Staff: (1 JRA) Rs. 2,695 (including allowances.) Total Rs. 3,695 (including allowances.) It was also recommended that the investigator be requested to confine his attention to the laws of molecular interaction.	II p. 1-3. The Board endorsed the recommendation of its Committee. It was further recommended that the Physical Research Committee be requested to reconsider whether the grant recommended would not be insufficient for the scheme.
III	*Subject* : **Fluorescence and Absorption Spectra of Organic Molecules by Dr. V. Ramakrishna Rao, Lecturer in Physics, Andhra University, Waltair.** *Object* : The object of the scheme is to investigate the chemical structure of molecules with the help of spectroscopy. *Scope* : While considerable work had been done on pure vibrational spectra of polyatomic (organic) molecules notably by Raman effect, knowledge of their electronic spectra is meagre. Absorption and fluorescent spectra are of great interest in obtaining knowledge of the values of the vibrational states. Absorption spectra provide information for both upper and lower states and fluorescence spectra for ground state only. A combination of both aids in the interpretation of the absorption and emission spectra. As data from both can only be completely investigated with a knowledge of Raman frequencies and their depolarisation factors, work on Raman effect will also be carried out where necessary. Much work has been done in Raman effect but work on absorption spectra is only of recent origin in this country, and has been started in the Andhra University under Prof. V.R. Rao and in Banaras Hindu University under Dr. R.K. Asundi. No work has been done on fluorescence spectra. *Author's record* : Dr. Rao has worked under Dr. H. Sponer of the Duke University and Dr. Cleveland at the Illinois Institute of Technology, Chicago. He has also communicated a paper to J.C.P. on the fluorescence spectrum of metoxylene and has done some work on absorption spectrum of meta difluoro-benzene and 3-chloropyridene. *Collaboration* : Prof. K. Rangadhama Rao will collaborate in the work.		

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	Grant asked for : Equipment (Condensers, quartz, fluorescent tubes, oil diffusion pump, absorption tubes, etc.) ... Rs. 5,000 Contingencies ... Rs. 1,000 Staff ... Nil. Total Rs. 6,000 *Research Committee's recommendation* : The scheme was considered by the Chemical Research Committee in their meeting held on the 3rd November 1952 (*Vide* Item No. (vi) page 107 of this agenda). *The Committee recommended that it might be considered by the Physical Research Committee under whose auspices investigations on absorption spectra of aromatic and heterocyclic compounds were in progress.* The Physical Research Committee has *recommended the scheme for sanction with a grant of* Rs. 2,000 *only for contingencies* (*Vide* Item No. XXXVII.2.(ii) page 95 of this agenda).	III p. 3-5. The Committee recommended the Research Scheme on Fluorescence and Absorption Spectra of Organic Molecules by Dr. V. Ramakrishna Rao for sanction with the following grant : Equipment Nil Contingencies Rs. 2,000 Staff : Nil Total Rs. 2,000	III p. 3-5. The Board endorsed the recommendation of i Committee.
IV	*Subject* : **Investigation of Travelling Wave Disturbances in the Ionosphere by Spaced Receiver Method by Dr. B. Ramachandra Rao, Lecturer in Physics, Andhra University, Waltair.** *Object* : It is proposed to study the nature and origin of the travelling wave disturbances in the ionosphere bv examining the fading observed at three receivers situated at the corners of a right angled triangle. *Scope* : The examination of the fading records will provide data ragarding the origin of these disturbances in E & F layers. The disturbances can then be interpreted and correlated with other atmospheric and extra-terrestrial phenomena. Munro has cleared some anomalous patterns obtained by him for the F layer. The All India Radio has carried out work on fading with continuous wave technique but no work has been done in India on study of travelling disturbances in E layer on the spaced receiver technique using pulse transmitters. The information obtained in tropical latitudes will help to study the geomagnetic influence on these travelling disturbances.		

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Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	Author's record : Dr. Ramachandra Rao working in collaboration with Dr. D.F. Martyn in the Radio Research Laboratories at Mt. Stromlo, Canberra, recorded some unobserved features in the E layer fading. Histograms of the number of fading periods versus fading period showed a number of periodicities which were multiples of each other. This could not be accounted for theoretically and further data by the proposed three station method is necessary to understand the full implications of this type of fading. *Collaboration* : Dr. D.F. Martyn, Cheif Scientific Officer of the Australian Council of Scientific and Industrial Research has promised co-operation and advice. Collaboration of Prof. S. K. Mitra will also be available. *Duration* : The investigation will be continued for at least three years. *Grant asked for* : Equipment ... Rs 40,000 (Recording cameras, special type oscillographs, special 2 Kw peak power transmitter, high gain communication receivers, microfilm reader, aerials with accessories and auxiliaries). Contingencies ... Rs. 1,000 Staff ... Rs. 6,420 (including allowances) (One Junior Res. Asst. on Rs. 160-10-330 One Senior Research Asst. on Rs. 250-25-500). Total Rs. 47,420 (including allowances) *Research Committee's recommendation*: The Radio Research Committee, to whom the scheme was referred, has recommended the scheme (Vide Proceedings of the Research Committee in the Supplementary Agenda).	IV p. 5-7. The Committee recommended that the Research Scheme on Travelling Wave Disturbances in the Ionosphere by Dr. B. Ramachandra Rao be approved and the following grant be sanctioned : Equipment Rs. 15,000 Contingencies Rs. 1,000 Staff : Rs. 5,885 (including allowances.) (1. S. R. A. and 1. J. R. A) Total Rs. 21,885 (including allowances.) It was also recommended that Dr. Rao be requested to contact the Chairman, Radio Research Committee with a view to obtaining the communication receivers required by him from Disposal Stores.	IV p. 5-7. The Board endorsed the recommendations of its Committee.

RESEARCH SCHEMES

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
V	*Subject* : **Unimeter by Dr. K. Kadambi, Assistant Silviculturist, Forest Research Institute, Dehra Dun.** *Object* : The object of this scheme is to improve the instrument known as 'Unimeter' already developed by Dr. Kadambi. *Scope* : 'Unimeter' can be used as Ghat tracer, Abney level, Altimeter, Clinometer, Optical square, Sextant etc. It can also be used for determining the sectional height of a tree and in cedestal survey work. The author now proposes to improve the instrument further by (*i*) increasing the field of vision and accuracy of the readings, (*ii*) building a magnetic compass into the instrument (*iii*) adding a vernier and lens (*iv*) improving the stability (*v*) setting up a table of heights and (*vi*) inserting height readings on the anchor. *Collaboration* : It is proposed to carry out the work in collaboration with manufacturers of scientific instruments. *Duration* : The work will not exceed one year. *Grant asked for* : Equipment ... Nil Contingencies ... Rs. 2,500 (Building up the various parts such as vernier, lens, compass and optical equipment). Staff ... Nil Total Rs. 2,500 *Research Committee's recommendation* : The Physical Research Committee considered the scheme in their meeting held on the 17th December, 1952, but *did not recommend it*, as the proposer of the scheme could arrange with a commercial firm for its improvement manufacture, and sale. (*Vide* Proceedings of the Physical Research Committee Item No. XXXVII.2 (*v*) page 97 of this agenda).	V p. 9. The Committee agreed with the opinion of the Physical Research Committee and did not recommend the scheme for a grant-in-aid by the C.S.I.R.	V p. 9. The Board agreed with the opinion of the Physical Research Committee and did not recommend the scheme for a grant-in-aid by the C.S.I.R.

RESEARCH SCHEMES

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
VI	*Subject* : **X-ray Diffraction Studies of Crystals by Prof. K. Banerjee, Professor of Physics, Allahabad University.** *Scope* : Accurate determination of the positions of atoms inside crystals provide knowledge about binding forces between atoms and the origin of various physical properties of solids. There are a number of simple substances *e.g.* sulphur, whose atomic positions as determined by the Fourier Synthesis method will be of great value. Such a series of determinations is proposed to be carried out. Fourier Synthesis method has been employed for accurate determination of atomic arrangements of some organic and inorganic crystals but on account of the labour involved in calculations the number is limited. Efforts are also being made to make the computations easier. *Author's record* : The author and his collaborators have carried out Fourier Synthesis of the structure of anthraquinone, phenanthrene and benzil. A number of publications on X-ray crystollography has resulted from this work. Dr. Banerjee has also developed a method for obtaining the signs of the Fourier terms by an algebraic method. *Grant asked for* : Equipment ... Rs. 9,500 (Weissemberg goniometer, rotation-cum oscillation camera). Contingencies ... Rs. 500 Staff Rs. 6,900 (including allowances) (One Senior Res. Asst. on Rs. 250. One Jr. Res. Asst. on Rs. 200) Total Rs. 16,900 (including allowances) *Research Committee's recommendation* : The scheme has been *recommended* by the Physical Research Committee *for sanction with a special grant of Rs.* 1,500 *to enable construction of a rotation oscillator X-ray camera, Rs.* 500 *for contingencies and one Junior Research Assistant.* (*Vide* Proceedings of the Physical Research Committee under Item No. XXXVII.2.(*iii*) page 95 of this agenda).	VI p. 11. The Committee recommended the Research Scheme on X-ray Diffraction Studies of Crystals by Prof. K. Banerjee for award of the following grant-in-aid : Equipment ... Rs. 1,500 Contingencies ... Rs. 500 Staff: ... Rs. 2,420 (including allowances.) (1,J.R.A) Total Rs. 4,420 (including allowances.)	VI p. 11. The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
VII	*Subject*: **X-ray Studies of Indian Clays (Kaolin Group) by Dr. Sultana Z. Ali, Central Laboratories for Scientific and Industrial Research, Hyderabad-Deccan.** *Object* : The scheme envisages an exhaustive survey of Indian kaolinitic clays by the powder method of X-ray analysis with the object of determining their mineralogical nature as well as the nature of associated impurities. *Scope* : The proposed survey will enable a proper utilisation of Indian clays, and furnish information as to their Geological formation and re-estimation of the workable deposits of a particular clay. Work will first be directed to clays of great purity or those occurring in large deposits and then will be extended to those of lesser purity and extent. Apart from the work of Misra, pertaining to chemical analysis and physical and other tests to determine their ceramic and other properties of clays (Trans. Ind. Cer. Soc. **9**, pp. 149-152 (1950), on four Indian clays (Rajmahal, Travancore, Banda and Kasimbazar), no work employing X-ray methods appears to have been done so far in India. Even Misra's work is not exhaustive and no attempt has been made to interpret the X-ray powder diagrams fully with a view to identify the clays and impurities and explaining the X-ray lines not given by kaolinite. *Collaboration* : The priority list will be prepared in consultation with the Geological Survey of India and the C.G.C.R.I., Calcutta. The Geological Survey of India has a large collection of Indian kaolinitic clays whose mineralogical composition has yet to be determined. These clay samples may form the basis of the survey to begin with. *Author's record* : Dr. Sultana Z. Ali has worked with Dr. G. W. Brindley in U. K. on the thermal transformation in minerals closely related to clay minerals, making use of powder and single crystal techniques and one dimensional Fourier analysis to determine the changed positions of the atoms on heat treatment. X-ray studies on Hyderabad clays are at present in progress under her guidance. *Duration* : The scheme will take three years for completion of the first part namely, survey of Kaolinite clays of great and moderate purity or of very large deposits.		

RESEARCH SCHEMES

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	Grant asked for: Equipment: (Microphotometer and semi-focussing camera). ... Rs. 19,000 Contingencies: (X-ray films and chemicals). ... Rs. 2,000 Staff: (2 Senior Research Assistants each on Rs. 250-500. 1 Lab. Boy on Rs. 60 p.m.) ... Rs. 9,660 (including allowances) Total Rs. 30,660 (including allowances) The Central Laboratories for Scientific and Industrial Research has most of the specialised equipment necessary. An X-ray microphotometer and a semi-focussing camera are needed which they are not in a position to buy. *Research Committee's recommendation:* The Glass and Refractories Research Committee has *recommended the scheme for sanction* (*Vide* Item No. (iv) page 201 of this agenda). The Committee did not recommend the grant of Rs. 18,000 for the purchase of microphotometer. This may be provided by the Central Laboratories. Rs 1,000 *was recommended under Equipment.*	VII p. 13-15. The Committee recommended for approval the research scheme on X-ray Studies of Indian Clays by Dr. Sultana Z. Ali; the following grant was also recommended: Equipment ... Rs. 1,000 Contingencies ... Rs. 1,000 Staff: (I.S.R.A) ... Rs. 3,740 (including allowances.) Total Rs. 5,740 (including allowances.)	VII p. 13-15. The Board endorsed the recommendations of its Committee.
VIII	*Subject:* **Atomisation by Dr. M. Narasinga Rao, Reader, Department of Technology, Andhra University, Waltair.** *Object:* It is proposed to carry out a comparative study of the fundamental aspects of the process of atomisation. *Scope:* Work will be directed along the following lines :— (*i*) study of nozzle capacity expressed as sq. ft. of surface created per lb. of liquid atomised per minute; (*ii*) study of efficiency expressed as power consumed per sq. ft. of surface created; (*iii*) drop-size distribution for identical flow rates; and (*iv*) weight flow distribution. Production of finely divided sprays has long been practised for the purposes of spray drying of food and chemicals, introduction of liquid fuels into furnaces or internal combustion engines and for cooling of water or humidification of air.		

RESEARCH SCHEMES

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	The spray drying method has several advantages but certain disadvantages also, some of them due to lack of fundamental knowledge. Several designs of injection and spray nozzles are also there for introduction of liquid fuels and for cooling and humidification purposes. In all these methods the fundamental aspect namely the production of a very high ratio of surface to mass, resulting in very high evaporation rates deserves a thorough study. Three fundamentally different processes are employed to atomise liquids namely, pressure atomisation by nozzles, two fluid or gas atomisation and atomisation with high speed rotating discs, but the state of knowledge of fluid dynamics involved in the particular mechanisms is meagre. *Author's record* : Some work on counting the number and size of the drops is now being carried out in U.S.A. at the Universities of Wisconsin and Michigan. Dr. Narasinga Rao was associated in the working of the problem while at the University of Wisconsin. *Collaboration* : Help of the Chemical Engineering, Physics and Statistical Departments of the Andhra University will be available. *Grant asked for* : Equipment (Spray nozzles, pressure equipment, disc atomizers, flow raters, high speed camera etc.) ... Rs. 4,000 Contingencies. ... Rs. 1,000 Staff (One Research Asst. on Rs. 250-500). Rs. 3,780 (including allowances) Total Rs. 8,780 (including allowances) *Research Committee's recommendation* : The Chemical Research Committee *has not recommended the scheme for approval* (*Vide* Proceedings of the Chemical Research Committee Item No (vii) page 109 of this agenda).	VIII. p. 15-17. **The Committee recommended that the Research Scheme be referred back to the Chemical Research Committee for reconsideration.**	VIII p. 15-17. **The Board recommended that the Research Scheme be referred back to the Chemical Research Committee for reconsideration.**
IX	*Subject*: **The Occurrence and Utilisation of Dolomites by Prof. C. Mahadevan, Head of the Department of Geology and Dr. M. Narasinga Rao, Reader, Department of Technology, Andhra University, Waltair.** *Object*: The object of this scheme is to investigate in detail the occurrence and utilisation possibilities of Indian dolomites on a co-ordinated geological and technological basis.		

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	Scope: The work proposed to be carried out comprises a general study of the mode of occurrence, quality and extent of dolomite reserves, correlation between the composition and the geological horizons, enrichment of dolomites by simple processes, possibility of removing calcium carbonate by some processes of diffusion with chemicals and utilisation of the magnesium carbonate residue. Compounding of various compositions suitable as refractory materials and enrichment of dolomite by removing the greater part of the calcium content will also be done. The porous MgO, left over is a useful catalyst in nitrogen fixation process. Dolomite has been steadily gaining importance as an industrial raw material and finds utilisation extensively in several industries. In spite of India's large resources of dolomites, information as to the extent and quality of resources and their industrial uses is very meagre and work on these problems has been sporadic and without collaboration between geologists and chemical engineers. *Author's record:* Prof. Mahadevan has prepared a report on the dolomites and magnesium limestones available in India, for inclusion in the Dictionary of Raw Materials and Industrial Products of India (Wealth of India) and also published a paper on the subject (Trans. Ind. Cer. Soc. Vol. IV. No. 1, 1945). He is conducting a study of Archaen and Purana-formations rich in magnesium and calcium carbonates. Dr. Narasinga Rao has taken out a patent for a pressure process with CO_2. He has studied the kinetics and catalysts in the Wisconsin process of nitrogen fixation. At Wisconsin he studied the pressure temperature processes. *Grant asked for:* Equipment ... Rs. 25,000 (Flotation cells, carbonisation reactor, high temperature furnace, thermo couples, micro-voltmeters etc.). Contingencies (including T.A.) ... Rs. 2,500 Staff ... Rs. 7,200 (including allowances) (Two Junior Research Assts. on Rs. 200 p.m. One Lab. Attdt. on Rs. 35). Total Rs. 34,700 (including allowances) *Research Committee's recommendation:* The Chemical Research Committee in their meeting held on the 3rd November, 1952 considered the scheme but *did not recommend it for sanction* (*Vide* Item No. (viii) page 109 of this agenda).	IX p. 17-19 **The Committee did not recommend the Research Scheme for a grant.**	IX p. 17-19. **The Board did not recommend the Research Scheme for a grant.**

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Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
X	*Subject* : **Electrochemical Properties of Resin Systems in Relation to Reactions Involving Exchange of Ions by Dr. B.N. Ghosh, Reader in Chemistry, University College of Science, Calcutta.** *Object* : It is proposed to study the electrochemical behaviour of (synthetic) resins with a view to correlating the exchange capacity of an ion of the added electrolyte with its effect on the potential of the electrical double layer and to obtain information regarding the mechanism of ion-exchange reactions. *Scope* : Investigations will be carried out with synthetic resins as they have a known composition and can be obtained in pure state. Their exchange capacity is usually high and can be determined accurately and equilibrium in reaction is quickly attained. It is also proposed to test the electro-phoretic equations experimentally on the lines given below : (*i*) preparation of resins containing particles of graded sizes. (*ii*) determination of the number of particles per unit volume, their chloride content and chloride ion capacity. (*iii*) measurement of the electro-phoretic velocity of the particles. Recently the validity of the electro-phoretic and electro-osmotic equations has also been questioned by some authors and the investigation would be of value in this connection. No effort has been made to correlate the electro-kinetic potential of the resins with their absorptive power or exchange capacity. In India, Mukherjee and co-workers have made valuable contribution to the theory of ion-exchange in soils. Bhatnagar et. al. have investigated preparation, exchange capacity and adsorption characteristics of resins. Work is also underway in the N.C.L. and F.R.I. But electrochemical behaviour of the resins has not been studied. *Author's record* : Dr. Ghosh has studied the exchange behaviour of negatively charged manganese hydroxide towards H ions and contrary to belief observed that they displace less than their equivalent amount of ions. He has also investigated the stability of resin suspensions. *Duration* : It is expected to take three years		

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	Grant asked for : Equipment ... Rs. 1,000 Contingencies ... Rs. 1,000 Staff : ... Rs. 8,880 (including allowances) (One Sr. Research Asst. on Rs. 250-25-500. One Jr. Research Scholar on Rs. 160-10-330. One Lab. Asstt. on Rs. 60-105). Total Rs. 10,880 (including allowances) *Research Committee's recommendation* : An earlier scheme on the subject from Dr. Ghosh considered by the B.S.I.R. in the meeting held on the 13th March 1951 was not sanctioned as it was considered vague. He was requested to submit a specific problem of research dealing with a definite part of the field after taking into consideration the work already done in India. The present scheme is in response to this request. The scheme was circulated to the Chemical and Plastics Research Committees. The Chemical Research Committee has *recommended the scheme with provision for one Junior Research Assistant only*. The Plastics Research Committee has also *recommended the scheme for sanction.*	X p. 21-23. The Committee recommended that the Research Scheme on Electrochemical Properties of Resin Systems etc., by Dr. B.N. Ghosh be approved and the following grant be sanctioned :— Equipment ... Rs. 1,000 Contingencies ... Rs. 1,000 Staff : ... Rs. 2,805 (including allowances.) (1.J.R.A) Total Rs. 4,805 (including allowances.) It was also recommended that Dr. Ghosh be requested to discuss the programme of work with the Director, National Chemical Laboratory, with a view to avoiding any duplication of the work underway in the N.C.L.	X p. 21-23. The Board endorsed the recommendations of its Committee.
XI	*Subject* : **Studies on Complex Compounds of Rare Elements by Dr. Sarju Prasad, Reader in Inorganic Chemistry, Banaras Hindu University, Banaras.** *Scope* : It is proposed to study in this scheme the formation of complex compounds of rare elements in water and organic solvents by various physico-chemical methods and utilise the research in the manufacture of liquid gold, separation of rare elements especially rare earths and for analytical purposes. Formation of complexes in water, and organic solvents has been studied both abroad and in India (at the Banaras Hindu University) but quantitative data specially in the case of rare earths is very scanty. *Author's record* : Samples of liquid gold prepared by the author sent to Ferozabad are reported to have good adherence and lustre but were more viscous and took more time for firing than imported		

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	product. It is considered necessary to replace sulphur and resin by more suitable ingredients to make it less viscous. Complex compounds of $AuCl_3$ with various alcohols, pyridine, dibenzyl sulphide were also prepared and used in making liquid gold. Complex compounds of tin chloride with sodium hydroxide are now under investigation. *Duration* : The work is expected to take at least two years for completion. *Grant asked for* : Equipment (conductivity apparatus etc.) ... Rs. 2,000 Contingencies ... Rs. 2,000 Staff ... Rs. 3,660 (including allowances) (One Junior Research Asst. on Rs. 160 p.m. One Lab. Bearer on Rs. 40 p.m.). Total Rs. 7,660 (including allowances) *Research Committee's recommendation* : The Scheme was circulated to the Chemical Research Committee. The Committee *did not recommend it for sanction. Most members were of the view that it might have been acceptable if it represented extension of work already carried out or the author had given some evidence of achievement in the field.*	XI p. 23-25. The Committee did not recommend the scheme for a grant.	XI p 23-25. The Board did not recommend the scheme for a grant.
XII	*Subject* : **Economic Utilisation of Tamarind Seed by Dr. A.N. Puri, D.Sc., Director, Field Research Station, Bombay.** *Object* and *Scope* : The main objective of the scheme is the whitening of the mucilagenous material present in the tamarind seed kernel and its conversion into an adhesive. The following aspects of economic utilisation of the seed cortex and the kernel will also be investigated. (A) Seed cortex. (*i*) economic use of the red dye present in the cortex. (*ii*) utilisation of the resinous component of the cortex as a raw material for plastics and as a soil stabilizer.		

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	(B) Seed kernel. (*i*) utilisation of pectins and mucilagenous compounds for sizing jute and textiles. (*ii*) use of powdered kernel fractions as protective colloids, thickeners, stabilizers and extenders for plastic adhesives, as a substitute for natural gum and in making cement impermeable to water. (C) method for detection of seed powder now used as adulterant for flour and other food materials will also be investigated. Approximately 90,000 tons of tamarind seed are available in the country annually. This would yield : (*a*) 50,000 tons high class starch for sizing, thus saving about double the quantity of cereals for food ; (*b*) 2,000 tons of edible oil and 15,000 tons of cattle food ; (*c*) 2,000 tons of vegetable pigment. Tamarind starch could be made for Rs. 25-30 per cwt. as against Rs. 40-50 per cwt., the current market price of cereal starch. *Location and Duration* : The proposed investigation is to be conducted in Dr. Puri's laboratory (Field Research Station) in Bombay and is expected to take two years. *Grant asked for* : Equipment : ... Rs. 15,000 (Special apparatus such as colour comparator, pH meter, viscometer, constant temperature oven, electric furnace, small hydraulic press, emulsifier, large soxhlet extractor, filter press etc.) Contingencies : (including T.A.) ... Rs. 5,000 Staff : ... Rs. 10,986 (including allowances) (One Senior Research Asst. One Junior Research Asst. One Senior Lab. Asst. One Junior Lab. Asst.). Total Rs. 30,986 (including allowances)		

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	Research Committee's recommendation : The scheme was considered by the Chemical Research Committe in its meeting held on the 3rd November, 1952. As *Dr. Puri's scheme was vaguely worded and laboratory facilities in Dr. Puri's own laboratory were limited, the Committee desired the Chairman to discuss the problem further with Dr. Puri and then request Dr. Puri to submit a modified scheme which indicates clearly the specific programme of work to be pursued* (*Vide* Item No. (v) page 107 of this agenda).	XII p. 25-29. The Committee noted that the Chairman of the Chemical Research Committee had since discussed the scheme with Dr. Puri and he had recommended the scheme in a modified form. Dr. Puri will take up the problem of defatting, bleaching and size reduction of tamarind kernel powder for use as sizing agent. The Committee recommended that the research scheme in the modified form be approved and the following grant be made to Dr. Puri : – Equipment ... Nil Contingencies ... Rs. 1,000 Staff : ... Rs. 2,805 (including allowances.) (1 J.R.A) Total Rs. 3,805 (including allowances.) The Committee further recommended that Dr. Puri be requested to carry out the work in collaboration with Dr. J. G.Kane and Dr. G.M. Nabar of the University of Bombay as suggested by the Chairman, Chemical Research Committee.	XII p. 25-29. The Board noted and endorsed the recommendations of its Committee.
XIII	*Subject* : **Extraction of *Vernalin* a Substance Formed During the Vernalisation of Seeds by Dr. S.C. Chakravarti, Associate Professor of Botany, B.R. College, Agra.** *Object* : The object of this scheme is the extraction and isolation of *vernalin*. Low temperature treatment of sprouting seeds of certain plants leads to early flowering of plants raised by them. This is believed to be due to the formation of a chemical substance, '*Vernalin*', formed in the embryo. This substance has not so far been isolated. Florigen has been isolated by Roberts and this when sprayed on the leaves of a plant induces flowering. *Vernalin* has greater possibilities. *Scope* : The work will be carried out on (*i*) vernalisation of the seeds (fresh or dried at various temperatures) according to the technique of Sen and Chakravarti, (*ii*) extraction trials to find out the most suitable solvent, and (*iii*) testing the presence of *vernalin* in the extracts by sowing seeds soaked in the extract and others soaked in distilled water for comparison. *Author's record* : Dr. Chakravarti has observed that during vernalisation of mustard seeds a thermostable autocatalytic substance is formed. This catalyses the synthesis of another substance (florigen) which on reaching a maximum concentration brings about florination. He has also contributed about two dozen papers on the subject. *Duration & collaboration* : The scheme is expected to take three years and collaboration of the Heads of the Departments of Chemistry of Agra College and B.R. College, Agra, will be available.		

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	Grant asked for : Equipment (Glass house) ... Rs. 3,500 Contingencies ... Rs. 1,350 Staff (One Junior Research. Asst. on Rs. 160 p.m. in the scale Rs. 160-10-330). — Rs. 2,640 (including allowances) Total Rs. 7,490 (including allowances) A glass house is needed for off season work, to observe the maximum difference in vegetative cycle of plants raised from vernalised and normal seeds. *Research Committee's recommendation* : The scheme has been referred to the Chemical Research Committee.	XIII p. 29-31. The Committee noted that the opinion of the Chemical Research Committee had since been received, according to which *Vernalin* was merely a postulate and even if its existence was proved, its extraction, identification etc., would have to be carried out by a skilled organic-chemist. The Research Committee had recommended that the scheme be referred to the Indian Council of Agricultural Research. The Committee agreed with the opinion of the Reseorch Committee and endorsed its recommendation.	XIII p. 29-31. The Board noted the opinion of the Chemical Research Committee and endorsed its recommendation that the scheme be referred to the Indian Council of Agricultural Research.
XIV	*Subject* : **Cultivation and Commercial Development of Medicinal and Economic Plants (Insecticidal and Insect Repellant Group) of North-Western Himalayan Region by Col. R.N. Chopra Director, Drug Research Laboratory, Jammu.** *Object* : The object of this scheme is : (*a*) cultivation and development of medicinal and other economic plants of North-Western Himalayan region. (*b*) study of insecticidal and insect repellant plants with a view to bringing them into general use to deal with pests infesting animals and agricultural products. *Plan of Work* : The work will be carried out on the following lines :— (*i*) (*a*) Medicinal plants : Cultivation of selected varieties such as Artemisia brevifolia, Cassia angustifolia, Glycyrrhiza glabra, Colchicum luteum. Effect of different manures and fertilisers on their growth and active principle content, hybridisation and selection. (*b*) Study of the following insecticidal plants : Derris elliptica and allied species, Delphinium sp., Veratrum album and Veratrum viride, Tephrosia sp., Lonchocarpus sp., Picrasma excelsa, Mundulea sp.		

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	(*c*) Study of the following insect repellant plants : Pogostemon patchouli, Andropogon nardus, Cymbopogon nardus, Ocimum gratissimum, Artemisia absinthium, Saussurea lappa. (*ii*) Detailed survey of medicinal and economic plants of North-Western Himalayan region with the ultimate object of writing out the flora of this region. This will include collection of authentic herbarium samples and study of their chemical composition. (*iii*) Search for substitutes of official drugs which do not grow in this country. *Author's record* : Col. Chopra says that very useful work on cultivation of medicinal plants such as Belladonna, Hyoscyamus, Digitalis and Pyrethrum has been done by him in the scheme on survey, cultivation and improvement of the quality of medicinal plants with encouraging results. The Kashmir Government are now proposing to take up large scale commercial cultivation of these plants under the five year development plan. Some survey work has also been done in Jammu and Kashmir and a list of medicinal substitutes for some of the Pharmacopoeial Drugs is also under preparation, but little has been done on these lines particularly with regard to the North-Western Himalayas except a preliminary survey by the Durg Research Laboratory, Jammu. *Duration* : The work is expected to last five years in the first instance. *Grant asked for* : Equipment ... Nil. Contingencies ... Rs. 2,000 Staff ... Rs. 9,912 (including allowances) (One Botanist on Rs. 500 p.m. in the scale Rs. 250-25-500. One Plant Collector on Rs. 75 p.m. One Steno-Typist on Rs. 67 p.m.). Total Rs. 11,912 (including allowances) *Research Committee's recommendation* : The Research Committee considered the scheme at its last meeting held on 7th January, 1953 and *recommended it for sanction.* *The Committee requested Col. R.N. Chopra that in order to help identification of real drugs in powder form as available in Indian markets, good description with diagram of the part used medicinally be prepared and that the pharmocognostical work be taken up in the Central Drug Research Institute, Lucknow* (*Vide* Proceedings of the P & D Research Committee under Item No. (*v*) pages 123-125 of this agenda).	XIV p. 31-33. The Committee recommended that the Scheme on Medicinal and Economic Plants of N.W. Himalayan Region by Col. R. N. Chopra be approved and the following grant be made :— Equipment ... Nil Contingencies ... Rs. 2,000 Staff : ... Rs. 13,321 (including allowances.) (2 S.R.A's, 1 Plant Collector, 1 Steno-typist). Total Rs. 15,321 (including allowances.) The Committee also endorsed the recommendation of the Pharmaceuticals & Drugs Research Committee regarding the programme of work.	XIV p. 31-33. The Board endorsed the recommendations of its Committee.

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XV	*Subject* : **Finding a Rich Source of Stigmasterol and its Isolation by Dr. R.N. Chakravarti, Professor of Chemistry, School of Tropical Medicine, Calcutta.** *Object* : The aim of this research scheme is to find an economic source of stigmasterol with a view to its manufacture. *Scope* : Stigmasterol, a valuable raw material for the manufacture of many important steroid products, progesterone, desoxycorticosterone, pregnenolone etc. is widely distributed in many plants in minute quantities, associated with larger quantities α, β & γ sistosterols and phytosterols. Plants of the genera Cassia, Dolichos, Lathyrus, Phaseolus and Vigna belonging to N.O. Leguminosae, will be investigated as sources of stigmasterol on account of their similarity with genus Glycine. Most of these plants grow wild and their seeds being inedible are not marketed. The work proposed to be done comprises isolation of the sterol constituents of various plants (flower, fruit root, bark etc.) and separation of stigmasterol from the other sterols present. *Author's record*: Dr. Chakravarti has experience in this field of research and has recently isolated stigmasterol from the sterol fraction of Enhydra fluctuans (Laur.) J. Am. Chem. Soc. 71, 2226 (1949). *Duration* : The scheme is expected to last about five years. *Grant asked for* : Equipment: Nil Contingencies: ... Rs. 2,000 Staff: ... Rs. 5,092 (including allowances) (One Junior Research Asst. on Rs. 160-10-330. One Lab. Bearer on Rs. 31 p.m.) Total. Rs. 7092 (including allowances) *Research Committee's recommendation* : The P. & D. Research Committee considered the scheme in their meeting held on the 7th January, 1953 and *recommended the scheme for sanction with a contingency grant of Rs.* 1,000 *and one Junior Research Asst.* (*Vide* Proceedings of the P & D. Research Committee Item No. 3 (i) on page 121 of this agenda).	XV p. 35. The Committeee recommended that the Research Scheme on Stigmasterol by Dr. R.N. Chakravarti be approved and the following grant be made :— Equipment ... Nil Contingencies ... Rs. 1,000 Staff: ... Rs. 2,805 (including allowances.) (1 J.R.A) Total Rs. 3,805 (including allowances.)	XV p. 35. The Board endorsed the recommendations of its Committee.

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XVI	*Subject* : **Haemostatic Action of Certain Plants by Dr. G. S. Pendse, Secretary, and Dr. R. G. Modak, M.D., Director, Indian Drug Research Association, Poona.** *Object* : It is proposed to carry out chemical and pharmacological studies on the following three plants :— (*i*) Typha angustata. (*ii*) Briophyllum calycinum. (*iii*) Tridax procumbens. *Scope* : In the scheme on bactericidal and fungicidal properties of some select plants, since terminated, preliminary investigations showed that certain plant extracts had pronounced haemostatic properties. These plants need further investigation. In addition to the haemostatic property of the above plants, fungicidal properties of Acorus calamus will be taken up for further investigation. Typha angustata has been chemically investigated in Japan and elsewhere with regard to seed-oil, starch, and glucoside contents. Acorus calamus has also been investigated chemically. In spite of work done partially on the chemical side of these plants, their medicinal properties have not been investigated properly. *Collaboration* : The work is proposed to be done in the laboratory of the Indian Drug Research Association, Poona, in collaboration with Prof. B.V. Bhide (S.P. College for chemical work and Prof. Aiman of the Pharmacology Department, B.J. Medical College, Poona. *Duration* : The investigation is expected to be completed in one year. *Grant asked for* : Equipment (large size soxhlet apparatus etc.) ... Rs. 1,000 Contingencies: ... Rs. 1,000 Staff ... Rs. 4,020 (including allowances). (One Jr. Research Asst. on Rs. 200. One peon part-time on Rs. 30 p m.) Total Rs. 6,020 (including allowances). *Research Committee's recommendation* : The scheme *has not been recommended for sanction* by the Pharmaceuticals & Drugs Research Committee. (*Vide* Proceedings of the Research Committee under Item No. (*vi*) page 125 of this agenda).	XVI p. 37. The Committee did not recommend the scheme for a grant.	XVI p. 37. The Board did not recommend the scheme for a grant.

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XVII	*Subject* : **A New Method of Preparation of Isonicotinic acid hydrazide, by Dr. D.K. Banerjee, Professor of Organic Chemistry, College of Engineering and Technology, Calcutta** *Object* : The object of the scheme is to prepare isonicotinic acid hydrazide from γ-piperidone. *Scope* : Recently isonicotinic acid has been claimed to be a potent antitubercular drug. γ-methyl piperidine, a coal tar product, is the usual starting material, but the import of this chemical to India would be costly. Acrylonitrile from which γ-pipridone can be made could be imported cheaply. *Author's record* : Dr Banerjee has carried out similar investigations on drugs such as Estrone, Yatren, Phenacetin, Hexasterol ; has taken patents and published five papers in the American Chemical Society Journal in these subjects. *Duration* : The investigation is expected to be completed in one year. *Grant asked for* : Equipment ... Nil. Contingencies ... Rs. 1,000 Staff ... Rs. 3,060 (including allowances) (One Research Asst. on Rs. 160 p.m. Total Rs. 4,060 (including allowances) *Research Committee's recommendation* : The Pharmaceuticals & Drugs Research Committee has *not recommended the scheme for sanction.* (*Vide* Proceedings of the P. & D. Research Committee under Item No. (*viii*) page 125 of this agenda).	XVII p. 39. The Committee recommended that the Research Scheme be referred back to the Pharmaceuticals and Drugs Research Committee for reconsideration and also to the Chemical Research Committee. The Committee considered that the question of preparing Isonicotinic-acid-hydrazide from Indian raw-materials as far as possible should be examined in the scheme.	XVII p. 39. The Board endorsed the recommendation of its Committee.
XVIII	*Subject* : **Therapeutic Effects of Iodine Compounds on the Clinical Course and the Rate of Relapse of Typhoid Fever Cases by Dr. J.C. Banerjee, Professor of Medicine, Medical College, Calcutta.** *Object* : It is proposed (*i*) to study the possibilities of treating typhoid fever with a series of cheap chemotherapeutic drugs (iodine compounds) and (*ii*) to explore the possibilities of		

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	reducing relapse rate of typhoid fever by combined antibiotic therapy and chemotherapy with iodine compounds. *Scope* : Although the treatment of typhoid fever has undergone phenomenal change with the introduction of chloromycetin the cost of treatment is beyond the means of the poorer classes of India; the rate of relapse of typhoid fever has now increased and posed a fresh problem. Patel in Bombay has used a tin compound (Aldestan) for the treatment of typhoid fever. Dr. Banerjee in clinical trials at the Medical College Hospital, Calcutta has observed the rate of relapse of typhoid fever under chloromycetin therapy to be about 40 per cent. Dr. S. Chattopadhya has observed a significant therapeutic effect of an iodine compound in a number of typhoid fever cases. This needs thorough investigation. *Duration* : The scheme will take two years for completion. *Grant asked for*: Equipment ... Nil Contingencies ... Rs. 500 Staff ... Rs. 4,230 (including allowances) (One Senior Research Assistant on Rs. 250) Total Rs. 4,730 (including allowances) *Research Committee's recommendation* : The Pharmaceuticals and Drugs Research Committee *has not recommended the scheme for approval* (*Vide* Proceedings of the Committee under Item No. (*iv*) page 123 of this agenda).	XVIII p 39-41. The Committee did not recommend the scheme for a grant.	XVIII p. 39-41. The Board did not recommend the scheme for a grant.
XIX	*Subject* : **New Paths to Chloramphenicol (Chloromycetin) by Dr. A. Tyabji, Ph.D. (Zurich); Bombay.** *Object* : The object of this scheme is the preparation of Ph CHOH CH.NH_2.CH_2OH (β-phenyl serine alcohol), an intermediate for the synthesis of chloromycetin, from mandelic acid or phenyl vinyl ketone and also to devise cheaper and better methods for the reduction of β-phenyl and β-paranitrophenyl serine than by Bergmann's method using $LiAlH_4$. The reaction mechanics of the mode of addition of NOCl or HOCl to phenyl-vinyl ketone will also be studied. *Scope* : Some work in this field has been done by Marshall and Walker as well as Carrara and collaborators. Methods for preparation of the drug chloromycetin are covered by extensive		

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	patents but none of them starts with mandelic or phenyl vinyl ketone. The proposed method will be a new approach. *Author's record* : Dr. Tyabji has worked in synthetic organic and organo-metallic chemistry and published several papers. *Collaboration* : The Principal, Institute of Science, Bombay has offered facilities for the conduct of the investigation. *Grant asked for* : Equipment ... Nil Contingencies : (Chemicals) ... Rs. 1,000 Staff ... Rs. 6,390 (including allowances) Honorarium of Rs. 400 p.m. to Dr. Tyabji. (Dr. Tyabji will welcome the honorarium but is prepared to undertake the work without it). One Lab. Attendant on Rs. 60 p.m. Total Rs. 7,390 (including allowances). *Research Committee's recommendation* : The P. & D. Research Committee has *recommended the scheme for sanction with a contingency grant of Rs. 1000 only. The honorarium to the investigator has not been recommended.* (*Vide* Proceedings of the P. & D. Research Committee Item No. (*vii*) page 125 of this agenda).	XIX p. 41-43. The Committee recommended that the Research Scheme on Chloramphenicol by Dr. A. Tyabji be approved and a grant of Rs. 1,000 towards contingent expenditure only be sanctioned. It was also recommended that the grant be placed through the Principal, Institute of Science, Bombay.	XIX p. 41-43. The Board endorsed the recommendations of its Committee.
XX	*Subject* : **Biosynthesis of Citrinin Analogues and Study of Their Mechanism of Action by Dr. A. Sreenivasan and Mr. D.V. Tamhane, Department of Chemical Technology, Bombay.** *Scope* : It is proposed to take up in the scheme : A.(*i*) Biosynthesis of citrinin making use of o-chlorophenylic acetic acid, 3 : 5-dihydroxy phenyl acetic acid or its other derivatives with possible precursors of biosynthetic citrinin (using A. candidus). Parallel experiments with cultures of P. chrysogenum Q. 176 will also be carried out.		

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	(*ii*) Modification of citrinin molecule making use of betaphenylethanol derivatives and 4-chloro-amino or nitro-resorcinol-2-carboxylic acids in the fermenting medium. (*iii*) Study of absorption spectra of metabolite solution from A.candidus cultures after the removal of citrinin to characterize the intermediate products of the biosynthesis. B. Study of mechanism of citrinin and its derivatives in comparison with other antibiotics (auromycin and terramycin) as to effect of succinic and citichrome oxidase systems, effect on respiration of susceptible or non-susceptible organisms, oxidative phospherylation and nitrogen metabolism of bacteria under bacterial de-amination and nucleic acid metabolism. *Author's record* : The authors are already studying production of biosynthesis of the hexyl analogue of citrinin making use of 4-n-hexylresorceinol-6-glyoxylic acid together with ehylene glycol in replacement cultures of A. candidus. They are also carrying on the comparative study of the antibacterial and antifungal activity and toxicity of citrinin and its derivatives. The ability of antibiotics to exhibit the growth of micro organisms had been utilised, but little is known about their mode of action. A knowledge of active growth in the molecules will be useful for the synthesis of new antibacterials and for devising screening tests. The proposed scheme is to be taken up as an extension of the research scheme on citrinin under Dr. Venkataraman of Bombay University. *Duration* : The scheme will be completed in three years. *Grant asked for* : Equipment and Contingencies ... Rs. 1,200 Staff ... Rs. 3,280 (including allowances) (One Research Assistant on Rs. 170 for 2 months and on Rs. 180 for 10 months) Total Rs. 4,480 (including allowances) *Research Committee's recommendation* : The scheme has been referred to the Biochemical Research Committee and the P. & D. Research Committee for opinion. The P. & D. Committee has deferred the consideration of this scheme to the next meeting (*Vide* Item No. (*ix*) page 125 of this agenda).	XX p. 43-45. The Committee recommended that the D.S.I.R. be authorised to take departmental action on the recommendations of the Research Committees when these were received.	XX p. 43-45. The Board recommended that the D.S.I.R. be authorised to take departmental action on the recommendations of the Research Committees when these were received.

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XXI	*Subject* : **Studies in Trypsin Inhibitors in Indian Food-stuffs by Dr. (Mrs.) Kamala Sohonie, Head of the Department of Biochemistry, Institute of Science, Bombay.** *Object* : The scheme envisages the study of inhibitors in foodstuffs which retard or completely stop the enzymic activity of trypsin in the digestion of proteins in the intestines. *Scope* : The programme of investigation will comprise : (*i*) study of the distribution of inhibitors in common Indian foodstuffs (vegetables, pulses, cereals and fruits). (*ii*) study of their chemical and physical properties. (*iii*) isolation of inhibitors in pure crystalline form. (*iv*) study of the biological significance of the inhibitors by feeding experiments firstly on lower animals (rice-moth larvae) and finally on higher animals (rats). Quantitative effect of inhibitors on their growth will also be studied. *Author's record* : Mr. M.K. Gaitonde and Dr. (Mrs.) Kamala Sohonie have done some work on the inhibitors of field bean pulse, Bengal gram and cowpea, study of the separation of inhibitor from field bean in crude form and its properties, as well as its action on rice-moth larvae and have published a paper on the subject (J.S.I.R. August, 1952). *Duration* : The investigation is expected to take two years. *Grant asked for* : Equipment ... Nil. Contingencies ... Rs. 500 Staff ... Rs. 1,800. (One Research Asst. on Rs. 150 p.m. as stipend). Total Rs. 2,300 *Research Committee's recommendation* : The scheme was circulated to the Biochemical Research Committee for opinion. The Committee has *recommended acceptance of the scheme. Instead of a stipend being paid to an M.Sc. student, appointment of a Research Assistant in the grade Rs.* 160-10-330 *has been recommended for more efficient working of the scheme.*

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
XXI p. 47. The Committee recommended approval of the research scheme on Trypsin Inhibitors etc., by Dr. Kamala Sohonie. The following grant was also recommended : Equipment ... Nil Contingencies ... Rs. 500 Staff : ... Rs. 2,805 (including allowances.) (1 J.R.A.) Total Rs. 3,305 (including allowances.)	XXI p. 47. The Board endorsed the recommendations of its Committee.

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XXII	*Subject* : **Nutritive Value of Palm Gur by Dr. (Mrs.) Kamala Sohonie, Head of the Department of Biochemistry, Institute of Science, Bombay.** *Scope* : It is proposed to study in this scheme: (*i*) the protective mechanism in palm gur which prevents the destruction of vitamins present in the material. (*ii*) the nature of the dye reducing substances in gur (termed "apparent vitamin C") by paper chromatography and spectroscopy. (*iii*) nicotinic acid derivatives in palm gur. (*iv*) biological availability of these vitamins. (*v*) the amino acids of proteins and non-protein fractions by paper chromatography. (*vi*) increase of keeping quality of gur and removal of charring smell and bad odour. *Author's record* : Analytical work carried out on palm gur by Dr. Mrs. Sohonie has revealed the presence of ascorbic acid (32.0 mg./100 gms.), thiamine, riboflavin and nicotinic acid inspite of the fact that it is prepared by boiling neera in open pans at 120°C in high alkaline medium. This indicates the presence of a protective mechanism in gur which prevents the destruction of these vitamins. It may be that some dye reducing substances are formed during its preparation from neera. Such substances termed as 'apparent vitamin C' and consisting of reductone, reductic acid, dehydro-ascorbic acid and hydroxy tetronic acid are also known to exist in walnut, molasses, malt extract and some fruit juices. Nearly 40-50% dye reducing value of total vitamin C has been observed to be due to the 'apparent vitamin C' as estimated by enzyme ascorbic acid oxidase formaldehyde methods. The protein content was found to be 2-3%. *Duration* : The scheme is expected to take two years. *Grant asked for* : Equipment ... Nil Contingencies ... Rs. 500 Staff ... Rs. 3,540 (including allowances) (One Jr. Research Assistant on Rs. 200 p.m.) Total Rs. 4,040 (including allowances)		

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	Research Committee's recommendation : The Biochemical Research Committee at its last meeting held on 19th January 1953 *considered the scheme to be of topical interest and the scheme has been recommended.* (*Vide* Proceedings of the Committee under Item No. (*ix*) page 139 of this agenda).	XXII p. 49-51. The Committee recommended that the Research Scheme on Nutritive Value of Palm Gur by Dr. K. Sohonie be approved and the following grant be made :— Equipment ... Nil Contingencies ... Rs. 500 Staff: ... Rs. 2,805 (including allowances.) (1 J.R.A.) Total Rs. 3,305 (including allowances.) The Committee also recommended that Palmyrah Gur be also included in the programme of work.	XXII p. 49-51. The Board endorsed the recommendation of its Committee.
XXIII	*Subject* : **Preparation of Proteins and Protein Hydrolysates from Some Non-edible Varieties of Bombay Fish (for Clinical Use) by Dr. (Mrs.) Kamala Sohonie, Head of the Department of Biochemistry, Institute of Science, Bombay.** *Object* : The object of this scheme is the utilisation of non-edible fish (protein content 25-30%) caught along with edible varieties but thrown back into the sea. *Scope* : This source was greatly exploited in Germany during World War II. In the present context of food scarcity in India it is a promising field of study. *Plan of work* : (*i*) Extraction and isolation of total proteins, their purification and study of their nature ; (*ii*) Preparation of hydrolysates by acid, alkali and enzymic hydrolysis and study of their amino acid contents by Van Slyke's method, paper chromatography and microbiological essay and comparison with some standard casein hydrolysate ; (*iii*) Animal experiments to assess : (*a*) protein efficiency of the proteins in comparison with casein hydrolysates (experiments on rats); and (*b*) efficacy of prepared products by producing clinical conditions in rats and studying their recovery and extending the tests to human beings in case of encouraging results. The fish varieties chosen for investigation are : (*i*) Shark-Scolideon, (*ii*) Skates—Rhinchobatus Djiddenis (*iii*) Tetrodons etc. *Author's record* : Dr. (Mrs.) Kamala Sohonie has carried out preliminary investigation on the total proteins from two varieties of fish (Scolideon and Rhinchobatus Djiddensis) and acid hydrolysates and observed the presence of almost all essential amino acids in them. *Duration* : The scheme is expected to take two years.		

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	Grant asked for : Equipment — Nil Contingencies (including animal upkeep) — Rs. 800 Staff (One Research Asst. on Rs. 160 p.m.) — Rs. 3,060 (including allowances) Total — Rs. 3,860 (including allowances) *Research Committee's recommendation* : The Biochemical Research Committee *has not recommended the scheme for sanction as it could be more appropriately undertaken in the Laboratories of the Fisheries Department, Govt. of Bombay.* (*Vide* Proceedings of the Biochemical Research Committee Item No. (*x*) page 139. of this agenda).	XXIII p. 51-53. The Committee agreed with the opinion of the Biochemical Research Committee and did not recommend the scheme for a grant. It was also recommended that attention of the Fisheries Department, Government of Bombay, be drawn to this problem.	XXIII p. 51-53. The Board agreed with the opinion of the Biochemical Research Committee and did not recommend the scheme for a grant. The Board also endorsed the recommendation that attention of the Fisheries Department, Government of Bombay, be drawn to this problem.
XXIV	*Subject* : **Studies in Preservation of Fish by Dr. N.G. Magar, Institute of Science, Bombay.** *Object* : It is proposed to study the biochemical changes involved during processing of fish and study methods by which they could be minimised. Besides dietary habits of the people the biochemical changes in preserved fish may be responsible for the poorer appeal of such fish in India *Scope* : The programme of work comprises study of (*i*) preservative dips (sodium nitrite and hydroxylamine), (*ii*) the trimethylamine oxide content of various fishes (*iii*) use of different anti-oxidants like propyl gallate, nordihydroguaiaretic acid, butylated hydroxy anisole, ditertiary butyl-p-cresol and l-ascorbic acid by Chapman and Mckay's method (*iv*) changes brought about by denaturation of protein in salt dried and low temperature stored fish. *Author's record* : Dr. Magar has investigated 10 species of marine fish for their total and non-proteinous nitrogen, creatine, creatinine, urea and uric acid and also some species of dried fish for trimethyl amine oxide content. *Grant asked for* : Equipment — Nil Contingencies — Rs. 600 Staff (One Junior Research Asst. on Rs. 160 p.m.). — Rs. 3,060 (including allowances) Total — Rs. 3,660 (including allowances)		

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	Research Committee's recommendation : The Fisheries Development Adviser to whom the scheme was referred for opinion has recommended the scheme and has suggested that six different species of food fishes (both from in-shore and deep sea landings) may be taken up for study. The Director, C.F.T.R.I. says that the proposed investigation envisages only a repetition on Indian fish of the work carried out by others and does not seem to be of much value. Investigations on the use of $NaNO_2$ etc., have been made on every type of fish in Europe, America and Japan and results obtained on Indian fish are not likely to be different. Similarly non-proteinous nitrogenous constituents of fish muscle, storage of fatty fish and freezing preservation of fish have all been studied. The scheme does not appear to envisage any new aspects of study. The Biochemical Research Committee to whom the scheme was referred has *not recommended it for sanction* (*Vide* Item No. 3(ii) pages 133-135 of this agenda).	XXIV p. 53-55. The Committee did not recommend the scheme for a grant	XXIV p. 53-55. The Board did not recommend the scheme for a grant.
XXV	*Subject* : **Extraction of Colourless Cotton Seed Oil of Low Acidity by Mr. P.K Kurup and V. N. Neelkant, Industrial Chemists, Dayaram Surajmal Lahoti Oil Mills and Refinery, Hyderabad.** *Object* : The object of this scheme is to carry out pilot plant trial of a new process developed by the proposers of the scheme for extraction of colourless oil with very low free fatty acid content from cotton seeds. *Scope* : The cotton seed oil at present produced in India by expeller method is ruby red in colour and has a free fatty acid content upto 15 percent. It is claimed that by the new process making use of alkali treatment followed by bleaching with activated earths a refined oil of the colour of refined groundnut oil with free fatty acid content of less than 2% is obtained, thus reducing the refining loss to a minimum. *Location* : It is proposed to do the pilot plant investigation either at the Laboratory of the Techno Chemical Industries Ltd., Calicut or at the proposed laboratory to be set up with the Oil-Cake Extraction Mills to be shortly installed at Hyderabad. *Duration* : The scheme is expected to take not more than six months.		

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	Grant asked for : Equipment ... Rs. 16,000 (including Rs. 1,000 for the erection of the plant). Contingencies ... Rs. 4,000 (including Rs. 3,000 for raw-materials). Staff ... Rs. 15,660 (including allowances (One Chemist on Rs. 160 p.m. One Lab. Asst. on Rs. 100 p.m. One Clerk cum-Storekeeper cum Typist on Rs 55 p m. One Electrician on Rs. 120 p.m. Two Operators on Rs. 100 p.m. Three unskilled workmen on Rs. 60 p.m.) Total Rs. 35,660 (including allowances) As some of the items of equipment are already available, the amount asked for is Rs. 25,000 only. *Research Committee's recommendation* : The scheme has been referred to the Vegetable Oils Research Committee for opinion.	XXV p. 55-57. The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally as soon as the recommendation of the Vegetable Oils Research Committee was received.	XXV p. 55-57. The Board recommended that the D.S.I.R. be authorised to take necessary action departmentally as soon as the recommendation of the Vegetable Oils Research Committee was received.
XXVI	*Subject*: **Study of Natural Pozzolanas in India by Dr. Raj Nath, Head of the Department of Geology, Banaras Hindu University, Banaras.** *Object* : It is proposed to survey the distribution and extent of deposition of natural pozzolanas in India and to study the physical properties of different samples and their utilisation in the construction of roads, buildings, dams etc. Study of artificial pozzolanas, classification according to activity and improvement the activity of the less active types will also be done. *Scope* : In India natural pozzolanas are widely distributed but no work had been done so far on the above lines.		

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	Use of pozzolanas while doubling the efficiency is expected to reduce the cost of cementing materials by more than 50%. Natural pozzolanas of activity types 1, 2, 3, 4 are better than artificial pozzolanas (Surkhi). *Author's record* : Dr. Raj Nath has made theoretical studies of the problem but practical investigation is necessary. *Collaboration* : The work will be carried out in collaboration with the Colleges of Civil Engineering and Mining and Metallurgy of the Banaras Hindu University. *Duration*: The scheme is expected to take at least two years. *Grant asked for* : Equipment — Nil Contingencies (field and survey work, books, literature and materials). — not specified. Staff (One Senior Research Asst. on Rs. 250-25-500) ... Rs. 3,780 (including allowances) Total Rs. 3,780 (including allowances) *Research Committee's recommendation* : The scheme has been referred to the Building Research Committee for opinion.	XXVI p. 57-59. The Committee recommended that the D.S.I.R. be authorised to take necessary departmental action on receipt of the recommendation of the Building Research Committee.	XXVI p. 57-59. The Board recommended that the D.S.I.R. be authorised to take necessary departmental action on receipt of the recommendation of the Building Research Committee.
XXVII	*Subject* : **Combustion of Pulverized Coal by Dr. B. Ghosh, Assistant Professor of Chemical Engineering, College of Engineering and Technology, Calcutta.** *Object* : It is proposed to carry out a systematic study of combustion of pulverized coal from Indian sources with a view to developing methods for its utilisation in industrial furnaces. *Scope* : Empirical work on the problem has been done in foreign countries but no fundamental work has been done so far. The design of equipment etc., are also guarded by patents. In India the use of pulverized coal has been restricted to the cement and copper smelting industries.		

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	Author's record : Dr. Ghosh has carried out work on conditions governing production of stable flames with pulverized coal at the Coal Research Laboratory, Pittsburgh, U.S.A. with Dr. A.A. Orning and Dr. H.H. Lowry and contributed a paper based on this work. The proposed work will be in continuation of these investigations. *Duration* : The investigation is expected to take at least two years. *Grant asked for* : Equipment : ... Rs. 1,500 Contingencies : ... Rs. 1,000 Staff : ... Rs. 4,080 (including allowances (One Research Asst. on Rs. 160 p.m. One Laboratory Boy on Rs. 30 p.m.) Total Rs. 6,580 (including allowances *Research Committee's recommendation* : The Fuel Research Committe has *not recommended the scheme for sanction as it is vague It has also been recommended that Dr. Ghosh be requested to submit more concrete proposals giving in detail, particulars of the work he wishes to do.* (*Vide* Proceedings of the Fuel Research Committee under Item No. (iv) page 165 of this agenda).	XXVII p. 59-61. The Committee did not recommend the scheme for acceptance in its present form. It was recommended that Dr. Ghosh be requested to submit a revised scheme on the lines suggested by the Fuel Research Committee.	XXVII p. 59-61. The Board endorsed the recommendations of its Committee.
XXVIII	*Subject*: **Systematic Survey of Coalfields of Hyderabad State by the Director, Central Laboratories for Scientific and Industrial Research, Hyderabad.** *Object*: The object of this scheme is to set up a coal survey station at the Central Laboratories for Scientific and Industrial Research, Hyderabad (Dn) for systematic survey of the coalfields of Hyderabad State. *Scope*: The known coalfields in Hyderabad State produce about one million tons of coal annually and are the only suppliers of coal in South India. Some untapped coalfields also exist. The results of qualitative analysis on random samples of Hyderabad coalfields so far carried out are of little or no help in their classification, conservation or utilisation of these		

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	Work on a moderate scale was started on survey of coalfields in the State with a small grant in 1951 but with the meagre resources available more work is not possible and without work at a more rapid rate the value and purpose of the survey done will also be lost. *Duration*: The survey is expected to take about five years. *Grant asked for*: Equipment (including one jeep car) ... Rs. 24,000 (O.S.) Contingencies ... Rs. 8,000 (O.S.) Staff (2 Geologists and 4 Chemists, 3 Lab. Asstt. 2 Lab. Boys, 6 Kamaties) ... Rs. 32,472 (O.S.) (including allowances) Total Rs. 64,472 (O.S.) (including allowances) equivalent to Rs. 55,262 (I.G.) *Research Committee's recommendation*: The scheme was considered by the B.S.I.R. in their meeting held on the 12th August 1952 It was recommended that since the question of establishing a field survey station for Hyderabad was intimately linked up with the Field Survey Stations already located in various coal-bearing areas in the country, the scheme be brought before the Board at its next meeting along with the recommendation of the Fuel Research Committee. The scheme has since been considered by the Fuel Research Committee in their meeting held on the 18th November 1952 (*Vide* Item No. 6(i) page 163 of this agenda). The Committee felt that all survey work should be in line with the survey programme and procedure followed in other coalfields. The Fuel Research Institute should have a Regional Coal Survey Station in the Hyderabad area as in other coalfields and work should be carried out under the direct supervision of the coal survey organisation of the Fuel Research Institute. The staff should be trained in the Fuel Research Institute in methods of sampling and investigating the physical and chemical properties of coal. Dr. Lahiri pointed out that expenditure could be saved if full co-operation of the Hyderabad Central Laboratories could be obtained in the matter, as they had the building and much of the equipment. Their main problem was finance for recurring expenses. On an average the Coal Survey Stations of the F.R I. had cost about Rs. 1.5 to 2 lakhs for capital expenditure. As the purpose of the survey was not only to obtain information on coals but also to correlate the data with industrial behaviour of coals the scheme should be operated in collaboration with the Central Laboratories of Hyderabad. The D.S.I.R. pointed out		

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	that the Hyderabad Laboratories had been given substantial grants by the Government of India, and there should be no difficulty in getting full co-operation. The Committee *recommended* that in view of the importance of developing the Southern Coalfields, the scheme for physical and chemical survey of Hyderabad Coals be accepted and the grant asked for be sanctioned on condition that (a) the staff be appointed in consultation with the F.R.I. and be trained in the Institute or in one of its Regional Coal Survey Stations before being deputed to Hyderabad for the actual work, (b) a Regional Coal Survey Committee be appointed for the Coal Survey Programme of Hyderabad by the F.R.I. in co-operation with the Director of the Hyderabad Central Laboratories, and (c) all reports on the work of the Hyderabad Coal Survey be submitted regularly to the Director, Fuel Research Institute and be published by him as part of the programme of the survey of the Indian National coal resources, (d) the Director of Fuel Research Institute be empowered to examine and scrutinise the actual work and guide its policies, (e) the Station should cover not only the Hyderabad area but also the lignite resources of Madras and any similar fuel deposits in the South.	XXVIII p. 61-65. The Committee agreed with the Fuel Research Committee on the importance of a systematic survey of the fuel deposits of Southern India, and recommended that the Research Scheme by the Director, Central Laboratories, Hyderabad, be approved subject to the conditions that :— (*i*) the staff was selected in consultation with the Director, Fuel Research Institute and trained by the F.R.I., (*ii*) a Regional Coal Survey Committee was appointed, (*iii*) reports were submitted regularly and published as part of the National Coal Survey, (*iv*) the programme of work was drawn up in consultation with the Director, F.R.I. and integrated with the National Coal Survey, and (*v*) the scheme covered the lignite resources of Madras and other fuel deposits in the South. The Committee also recommended the following grant :— Equipment ... Nil Contingencies ... Rs. 5,000 Staff : ... Rs. 16,500 (including allowances.) (2 S.S.A's, 2 J.S.A's 2 J.L.A's ond 1 Lab. Att :) Total Rs. 21,500 (including allowances.)	
XXIX	*Subject* : **Recovery of Sulphur from Sulphur Bearing Indigenous Raw Materials by Dr. Sarju Prasad, Reader in Inorganic Chemistry, Banaras Hindu University.** *Object* : It is proposed to study interaction of gases (particularly chlorine) and sulphides at high temperatures to establish optimum conditions for the recovery or sulphur from indigenous sulphur bearing minerals economically. *Scope* : While in India sulphur does not occur in elemental form, sulphur bearing minerals are found in abundance. It is proposed to study the interaction of gases and sulphides at high temperatures and to find out the optimum conditions for recovery of sulphur. *Author's record* : The author has carried out small scale laboratory experiments to obtain sulphur monochloride from iron and copper pyrites by passing chlorine gas over the heated minerals. *Duration* : It will take at least two years.		XXVIII p. 61-65. The Board endorsed the recommendations of Committee.

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	Grant asked for : Equipment (Electric furnace, silica tubes). ... Rs. 3,000 Contingencies ... Rs. 1,500 Staff (One Junior Research Asst. on Rs. 200 p.m One Lab. Bearer on Rs. 40 p.m.). ... Rs. 4,140 (including allowances) Total Rs 8,640 (including allowances) *Research Committee's recommendation* : The scheme was circulated to the Chemical Research Committee. The Committee *has not recommended the scheme for sanction as similar work has already been done. If further work on chlorination of sulphidic minerals is necessary, it could be taken up in the National Chemical Laboratory where systematic study of minerals is in progress.*	XXIX p. 65-67. The Committee did not recommend the scheme for a grant. It was recommended that the problem be referred to the National Chemical Laboratory for investigation departmentally, if necessary.	XXIX p. 65-67. The Board endorsed the recommendations of its Committee.
XXX	*Subject* : **Soft-X-ray Spectroscopy of Metals, Semi-conducting and Fluorescent Solids by Dr. K. Das Gupta, Lecturer in Physics, University College of Science, Calcutta.** *Object and Scope* : It is proposed to take up (*i*) X-ray spectrographic study in the regions 30-500A and 5A to shorter wavelengths; (*ii*) valence band emission and absorption spectra of the following solids :— Elements : Lithium to carbon – K bands. Sodium to potassium – L bands. Potassium to zinc—M bands. Alloys : Binary transition group alloys, (magnetic and non-magnetic) like Mg-Al, Mg-Si, Al-Si, Cu-Zn, Cu-Al, etc. Binary alloys with impurities. Halides : Alkali-halides and alkaline-earth halides in pure state and with various types of imperfections. Oxides : Na_2O, MgO, Al_2O_3, SiO_2, Li_2O, BeO, oxides of Mn to Zn. Sulphides : of Be, Mg, Zn etc. It is proposed to set up two spectrographs (*i*) bent crystal vacuum spectrograph (one meter radius) for 5 to 19A., (*ii*) ruled concave glass grating spectrograph for 35 to 500 A. Two other spectrographs are already available. ›ta has experience in this field of research.		

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	Author's record : Dr. Das Gupta has worked on soft X-ray spectroscopy of solids and is now engaged in setting up a ruled grating procured from Professor Manne Siegbahn N.L. to investigate the region 30-500A and a bent crystal spectrograph for work on 5-19A with bent crystal holder obtained from Dr. Sandstorm of Upsala. *Grant asked for* : Equipment ... Rs. 36,000 (four rotary pumps, construction of two spectrographs, two X-ray tubes, two power units, vacuum gauges and accessories, photomultiplier detection circuits). Contingencies ... Rs. 1,000 Staff ... (Two Scholars, salary not specified) Total Rs. 37,000 plus salary of two scholars. *Research Committees recommendation* : The scheme has been referred to the Physical Research Committee for opinion.	XXX p. 67-69. The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the opinion of the Physical Research Committee.	XXX p. 67-69. The Board recommended that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the opinion of the Physical Research Committee.
XXXI	*Subject*: **Measurement of the Electrical Potential in the Upper Air by Dr. S.P. Venkiteshwaran Meteorologist, Meteorological Office, Poona.** *Object* : The object of this scheme is to develop the technique of measuring potential gradient in the upper atmosphere from the audio frequency modulation by adopting the electrometer system of Dr. Koenigsfild of Uccle with the American type of radio sonde. *Scope* : The method will prove useful in identification of air masses in upper atmosphere. *Author's record* : Dr. Venkiteshwaran has obtained records of potential gradient over Poona making use the technique. Before the technique is adopted for general use it is necessary to develop it and give intensive trial in one station in all types of weather and different parts of the day.		

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	Collaboration : The India Meteorological Department are interested in the investigation and are expected to provide facilities. *Grants asked for* : Equipment ... Nil. Contingencies ... Nil. Staff ... Rs. 3,720 (including allowances) (One Senior Research Asst. on Rs. 250-25-500) Total Rs. 3,720 (including allowances) *Research Committee's recommendation* : The scheme has been referred to the Atmospheric Research Committee for opinion.	XXXI p. 69-71. The Committee noted that according to the Atmospheric Research Committee the problem fell within the scope of the Meteorological Department. The Research Committee had also recommended that the Director General of Observatories be requested to provide the necessary assistance to Dr. Venkiteshwaran, giving the work the highest priority (vide item 3, p. 273 of this agenda) The Committee endorsed the recommendation of the Research Committee.	XXXI p. 69-71. The Board noted the views of the Atmospheric Research Committee and endorsed its recommendation.
XXXII	*Subject* : **Iron Production with Non-coking Coals on Pilot Plant Scale by the Chairman, Metals Research Committee.** *Note* : The original scheme on the subject of production of iron with non-coking coals on pilot plant scale submitted by Dr. Schrader, Director of Research, TISCO, was accepted in principle by the Board and Governing Body of the C.S.I.R. in their meetings held in November 1951. The total estimated expenditure on the scheme then was Rs. 5 lakhs and the Board recommended that the Government of India be approached for additional funds to finance the scheme. On the basis of the acceptance of the scheme in principle by the Board, the Chairman of the Research Committee obtained from Messrs. Klockner Humboldt Deutz and Demag of Germany estimates to set up this pilot plant. On the basis of these estimates the Chairman Metals Research Committee has submitted a revised scheme with a total expenditure of Rs.15 lakhs of which 8.5 lakhs would be required for equipment to be ordered from abroad, Rs.4.21 lakhs for structurals and water supply, and the annual recurring expenditure after the plant is put into operation would be Rs. 1.24 lakhs Production capacity of the pilot plant would be 15 tons per day and the scheme is a long term project to be worked out for not less than ten years. The TISCO have offered a 400 ton unused steel structure and certain equipment at the scrap value of Rs. 250 per ton. As the present cost of this material is Rs. 1,000 per ton, this offer will involve a net saving of Rs. 3 lakhs.		

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	Out of the grant asked for Rs. 5 lakhs will be required in the first year, Rs. 8 lakhs in the second year and Rs. 2 lakhs in the third year. Since low temperature carbonisation is excluded from the scheme, only the National Metallurgical Laboratory and the Tata Iron & Steel Co. may collaborate. The Fuel Research Institute will, however, furnish information regarding different types of coals to be employed in the process. The detailed programme of work would be chalked out by a Committee to be specially set up for the purpose. *Break up of the Estimates* : CAPITAL EXPENDITURE (Non-recurring) ... Rs. 14,91,956 Rounded off to Rs. 15,00,000 [Equipment (*i*) To be ordered from abroad Rs. 8,50,318 (*ii*) Available in India. ... Rs. 58,638 (*iii*) Building, electric wiring & power supply. ... Rs. 4,66,000 (*iv*) Erection of equipment ... Rs. 1,17,000] RECURRING EXPENDITURE ... Rs. 1,24,579 Rounded off to Rs. 1,25,000 [(No staff will be required in the first year). Staff from second year onwards : Rs. 45,579 One Research Metallurgist. Four Shift Foremen. Four Khalasis. Three Mazdoors. One occasional labour for unloading. Contingencies ... Rs. 79,000 (*i*) Raw matrials cost assured to be entirely covered by the return on the products, pig iron alloys and off grade material. (*ii*) Repairs and maintenance, power consumption, chemical analysis etc. to cost Rs. 79,000.]		

Research Committee's recommendation :

The Metals Research Committee considered the subject at its last meeting (*Vide* Proceedings of the Metals Research Committee Item No. 5(i) page 185 of this agenda). The Chairman explained the details of the revised estimates. He pointed out that the original scheme did not include building etc., as it was then considered that the pilot plant could be accommodated at the

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	National Metallurgical Laboratory or TISCO Laboratories. The present scheme was more comprehensive and the size of the plant was bigger. The Chairman had visited the manufacturers' plant in Germany and was of the opinion that low shaft furnace would offer good scope for development in India. Dr. Whitaker, however, suggested that the Council should send their problem to the Organisation for European Economic Cooperation and pay the prescribed charges. That will prove more economical than to instal a low shaft furnace in India. He also felt that the expenditure on the scheme would be ultimately more than Rs. 15 lakhs. It was pointed out that the fee for O.E.E.C. project was £ 10,000 a year and as the O.E.E.C. furnace was of 100 tons capacity, a very large sum of money may be spent on the transport of the material. Besides, it may not give a complete answer to the problems in India. Dr. M.S. Krishnan and Mr. Kapur were of the opinion that the expenditure of Rs.15 lakhs was of a capital nature and as the Indian raw-materials varied considerably it was advisable to have the experiments carried out in India on long term basis. The possibility of arranging with the O.E.E.C. the mutual exchange of technical and research data could be considered. The Chairman informed that the TISCO had no direct interest in the scheme and it had been put up purely in the interests of the country.	XXXII p. 71-75. The Committee noted that the C.S.I.R. had already accepted in principle the Pilot Plant Scheme for the Production of Iron with Non-coking Coal by the Low-Shaft Furnace Process. In view of the limited funds available with the C.S.I.R., the Committee recommended that the Government of India be requested to provide necessary additional funds to finance the scheme	XXXII p. 71-75. The Board noted and endorsed the recommendation of its Committee.
XXXIII	*Subject* : **Interim Report of the Committee on Low Cost Housing.** *Note* : 1. A Committee consisting of Lala Shri Ram, Dr. S. S. Bhatnagar, Dr. D. S. Kothari, Director, Central Building Research Institute and Dr. R.B. Gupta, was appointed in April 1952 with the following terms of reference :— (*i*) to study and analyse scientifically the basic minimum requirements of habitation in various parts of India ; (*ii*) to undertake a scientific study of the problem of housing both from the short and long term points of view ; (*iii*) to submit a report and make recommendations to Government on (*i*) and (*ii*) above within the period of a year; a preliminary report to be submitted within six months. The Committee held 6 meetings and a number of informal discussions and on the basis of the deliberations, has submitted an interim report, a copy of which is submitted along with this agenda.		

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	2. A summary of the recommendations made by the Committee is given below : –		
	(*i*) A start should be made for improvement of rural housing by putting up model houses and by improving the supply of water and sanitation in typical villages. The Community Projects Administration is doing a certain amount of work in this direction in selected areas. It will, however, be desirable for the state governments to set up a suitable agency for directing and coordinating this work.		
	(*ii*) In towns and cities, rooms of about 120 sq. ft. and verandah of about 80 sq. ft. with provision of a cooking chimney in one corner is all the built-in accommodation which should be aimed at for lower income groups at present. Each house should, however, have an area of 60 to 100 sq. yards enclosed by a wall or a hedge. Additional amenities like a bathroom, a lavatory, a kitchen and a store room can always be added according to the requirements and rent paying capacity of individual families or sections.		
	(*iii*) The manufacture of lime from kankar and lime stones where these are available in adequate quantities should be encouraged and the use of lime in building work popularised.		
	(*iv*) Considerable work has been done on soil stabilisation, rainproof mud plasters, etc. This work should be utilised in actual practice. Further researches and experiments in this field should be continued. Advance in this direction is likely to revolutionise the construction of residential houses.		
	(*v*) The truncated cone shaped hollow tile construction used in Hyderabad should be given an extended trial so that its defects and advantages could be fully judged.		
	(*vi*) The greatest possible advantage should be taken of such innovations as pre-stressed concrete by organising publicity and demonstrations.		
	(*vii*) Indian Standards Institution, Central Building Research Institute, Forest Research Institute, National Physical Laboratory and similar other institutions should undertake necessary enquiries to enable them to prescribe national standards in respect of building materials, equipments and components for use in construction work. This will make it possible for standardised materials to be produced on a commercial scale and to develop a proper market for the same.		
	(*viii*) A central organisation with regional departments should be established to stock tools and machines like power-driven saws, drills, chisels, steel shears, compressed air sprayers, concrete pumps, plaster spray guns, rivet guns, aluminium and steel scaffoldings, bulldozers, planers, excavators, concrete vibrators and floor polishing machines and hire them at reasonable rates with provision of service facilities.		
	(*ix*) Suitable studies should be undertaken of the present construction methods with a view to deciding whether a particular mechanical device should be used in preference to manual labour. Time studies of building operations should be carried out with a view to testing the		

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	suitability of any mechanical device. In short, mechanical devices should be adopted wherever they are found cheap and efficient and where the existing labour is incapable of doing a particular work efficiently or cheaply. (*x*) A scheme of materials, labour and tools required for construction should be drawn up in advance and arrangements to have them in position at proper places in accordance with a programme finalised before actual construction is started. (*xi*) The Council of Scientific & Industrial Research should examine the possibility of instituting a coordinated programme of reseaach embracing problems of design, functional and operational requirements of buildings, basic studies of structures, nature and properties of clays, minerals and soils. Reliable surveys should also be carried out to determine the performance of existing materials and equipment with a view to discovering how their use and effectiveness can be improved and also to introduce better and alternative materials and more efficient equipments and techniques of construction. (*xii*) In addition to the organisation of building research on a central and regional basis, it is desirable that the results of such researches should be duly co-ordinated and publicised to all building agencies both under public and private control so that experiments could be carried out on a commercial scale and concrete policies evolved on the basis of such researches and experiments. Fullest use should be made of the proposed National Research Development Corporation to see that the results of building research are made use of on a large scale. (*xiii*) Emphasis should be placed on functional or performance standards rather than on rigid specifications based on the quantity or volume of individual materials. Specifications should be revised periodically on the basis of results of research and new inventions. (*xiv*) With a view to helping the private investor to build houses for poor and middle class people the Committee considers that building materials should be made available and all obstacles or restrictions in the free transport of such materials should be abolished. The Committee further recommends that Government and private agencies for the easy availability of building materials should be established in all important parts of the country. (*xv*) The Committee considers that rent restriction legislation scare away many investors from putting their capital into buildings and recommends that such restrictions be abolished. (*xvi*) The Committee considers that a Central Town and Country Planning Act should be passed to enable systematic improvement and reconstruction of existing and future towns.	XXXIII p. 75-79. The Committee recommended that the Interim recommendations of the Committee on Low-Cost Housing be communicated to the Planning Commission and the Ministry of Works, Housing and Supply for necessary action. These recommendations may be useful to the National Building Organisation and the National Housing Board. As regards research, the Committee recommended that the Building Research Committee be requested to prepare a planned coordinated programme of research on the lines suggested after taking into account the facilities available at the Central Building Research Institute, the National Physical Laboratory, the Forest Research Institute and the other Research Institutions in the country.	XXXIII p. 75-79. The Board endorsed the recommendations of its Committee.

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XXXIV	*Subject*: **Report of the Committee to draw up proposals for implementation of the findings of the Coal Blending and Coking Research Scheme.** *Note* : 1. One of the important research projects of the C.S.I.R. is the Coal Blending and Coking Research Scheme at Jamshedpur. During the past 10 years the project has been in operation and extremely encouraging results have been obtained which show that metallurgical coal resources of India could be considerably extended. The B.S.I.R. in its meeting held in March 1952 recommended that utilisation of these results on a large scale should be examined and a report submitted to the Government of India for action. On the suggestion of Dr. Whitaker, Chairman of the Fuel Research Committee, an *Ad hoc* Committee consisting of representatives of the two Steel Companies, the Coal Commissioner, the Railway Board and the mining interests was constituted with the approval of the President, C.S.I.R. This Committee was to take into consideration the various practical difficulties in the way of implementation of these results and prepare a detailed report with specific proposals. 2. This Committee finalised its report in November 1952 which is submitted along with the agenda. Taking into consideration the present conditions of coal mining and iron and steel industries and of the transport position, the *Ad hoc* Committee has made the following *recommendations*:- *Present*: (*i*) (*a*) In view of the fact that there is ample production of coking coal, enforcement of substantial blending of non-coking or weakly caking coals for the production of metallurgical coke (at existing Iron & Steel Works) is premature and unnecessary at the present stage, and according to the Works' representatives on the Committee uneconomic. (*b*) As the ultimate criterion is to be the blast-furnace, it is suggested that a beginning be now made in blending, using small quantities of weakly caking coal which are unlikely to cause trouble. Such weakly caking coal can be incorporated to the extent of 5 per cent in the existing coking blends for, say, one year. If no adverse effects follow, the quantity can then be increased to 10 per cent in the subsequent year, and to 15 per cent in the year following, and so on; provided always that the process of blending be arrested as soon as any ill effects are observed. In this way the steel companies will gain valuable experience of the extent to which blending is practicable on a commercial scale, and the information will be of value for new iron and steel works and/or extensions to the present steel works. As the use of high volatile weakly caking coal may lead to increased costs (e.g coal consumption), Government should be prepared to compensate, if necessary. The representatives of the steel works do not subscribe to the recommendation (b), and suggest postponement of action to a suitable later date for reasons given in earlier notes and memoranda.		

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	Future : (*ii*) (*a*) At the projected new Iron & Steel Works, blending facilities including all arrangements for sidings, bunkering, etc. should be incorporated, and the plant provided should be suitable for blending not only coking coals themselves but also non-coking coals with coking coals. Railway transport arrangements for regular daily supplies of the coking and non-coking coals required must be thoroughly planned in advance. (*b*) It is unreasonable to enforce substantial blending at existing iron and steel works when there is ample production of coking coal. The steel output of the country should be increased to encourage general industrial expansion and to ensure the proper use of the coking coal output. (*c*) Railway transport facilities should be increased at once even to meet the present needs of the existing iron and steel works, as requisite supplies of the various coking coals are not being obtained regularly at the present time. If there were similar failures when blends were being made with non-coking coals, the results might be disastrous. It is clear that, before substantial blending can be contemplated on any large scale, the wagon supply and transport must be considerably strengthened. 3. The Fuel Research Committee at its last meeting considered these recommendations of the *Ad hoc* Committee (*Vide* Item No. 4 page 163 of this agenda). There was discussion especially on the Steel Companies' views that blending of non-coking coal with coking coal on an industrial scale should not be made compulsory unless the use of all coking coal for non-metallurgical purposes was restricted at the same time. The D.S.I.R. felt that wherever coking coal was being used for non-metallurgical purposes, it should be progressively replaced by non-coking coal and the surplus production of coking coal should be curtailed unless the consumption of coking coal for metallurgical purposes was increased by the expansion of the iron and steel industries. The Fuel Research Committee recommended that conservation of coking coal for blending was essential and accepted the Report of the Committee on the implementation of the findings of the C.B. & C.R. scheme and recommended that the practical aspects of the recommendations be considered by the Government. Since it was essential to make a beginning in practice, the proportions in the blends should be adjusted in the light of experience obtained in large scale operations with the cokes produced. 4. The recommendation of the *Ad hoc* Committee that at the projected Iron & Steel Works of the Government of India, blending facilities should be incorporated and the plant should be suitable for blending not only coking coals themselves but also non-coking coals, and that Railway transport arrangements for regular supplies of the coking and non-coking coals required must be thoroughly planned in advance, was placed before the President, C.S.I.R. and as desired by him, the recommendation has been referred to the Ministry of Production for examination and necessary action.	XXXIV p. 81-83. The Committee noted that results of the Scheme on Coal Blending and Coking had demonstrated that the metallurgical coal resources of India could be considerably extended by blending good coking coals with 30 to 40% moderately caking coals or with 10 to 20% of poorly coking coals. The Committee generally agreed with the recommendations of the Special Committee, viz., (*i*) enforced blending on a substantial scale at present would be premature and unnecessary but a beginning may be made in blending using small quantities of weakly caking coals which are unlikely to cause trouble, (*ii*) at the projected Iron and Steel Works blending facilities should be provided and the plant should be designed for use of blended coking coals as well as non-coking coals, (*iii*) Railway transport arrangements should be made on an adequate scale for regular supplies of the different varieties of coal required. The Committee noted that the recommendation pertaining to the new steel project had been referred to the Ministry of Production for implementation. The Committee recommended that the Report of the Special Committee along with its recommendations be also sent to the Ministry of Commerce and Industry and the Railway Board for necessary action.	XXXIV p. 81-83. The Board noted and endorsed the recommendations of its Committee.

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XXXV	*Subject:* **Exemption of alcohol required for bonafide research and industrial purposes from duty.** *Note:* The above subject was discussed by the B.S.I.R. in their 24th and 26th meetings held on the 18th March, 1950 and the 13th March, 1951 respectively. In pursuance of the recommendations of the B.S.I.R. the matter was taken up with the Ministry of Finance. The Expert Committee (Excise) of the Government of India went into the question in all its aspects and action was taken on such of these recommendations of the Committee which were accepted by the Government of India. The Ministry of Finance has given the following information explaining the present position with regard to the subject. 1. *Concession of duty free alcohol for undertaking of research for public benifit or for development of science.* The Central Government are empowered to levy excise duty, only on medicinal and toilet preparations containing alcohol. Alcohol, as such is outside their scope, if it is capable of human consumption as liquor. The State Governments have the final say in the matter in so far as duty-free supply of alcohol for research and scientific purposes is concerned. Supply of rectified spirit at a concessional rate of duty of Rs. 5 per L.P. gallon to private institutions or scientific laboratories which do not fully satisfy the condition of their research being for public benefit or development of science, is not likely to be agreed to by the State Governments. The State Governments are consequently opposed to the levy of a low rate of duty at Rs. 5 per L.P. gallon on manufactures in bond, even in respect of medicinal and toilet preparations. 2. *Supply of molasses and mohwra flowers:* The Government of Bombay who had imposed restrictions on the possession, storage and transport of molasses and mohwra flowers have accepted the recommendation of the Expert Committee that "industry should have facilities to buy these materials easily when required for genuine industrial purposes." 3. *Price of alcohol in the State of Bombay :* The Government of Bombay have since agreed to allow the industry to purchase rectified spirit in the cheapest market provided the prior sanction of the Director to import from outside the Bombay State is obtained in each case. They have, however, stated their inability to fix the price of the spirit produced in their own distilleries at a price which does not bear the proper relation to their own cost of production.		

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	4. *Restriction on inter-State movement, and movement within each State.* The existing State Laws on the subject are protected by the provisions of the Constitution, unless order to the contrary is issued by the President. The factual position has been ascertained with reference to each State and the question, which is a very difficult one, will be pursued in consultation with the Ministry of Commerce and Industry. 5. *Manufacture to be in bond for being assessable to concessional rate of duty* : Some of the major State Governments are opposed to the Committee's recommendations in regard to a higher rate of duty being charged in respect of manufacture in bond. It has been proposed to the Cabinet that the higher rate of duty (Rs. 17/8/- per proof gallon) should apply only to preparations which are capable of use as alcoholic beverages and toilet preparations, whether manufactured in bond or not ; preparation which are not so capable are proposed to be assessed at Rs. 5 per proof gallon. The legislation would, however, be so framed as to make it possible under the Rules to grant exemptions, where necessary. Final orders have not yet been passed by the Cabinet who have asked for further information. 6. *Uniform rate of duty for medicinal preparations* : The followig interim recommendations of the Excise Committee have been generally given effect to and no change has since been made (*i*) that the rate of excise duty should be uniform @ Rs. 5 per gallon of L.P. alcohol contained in purely medicinal preparations and Rs. 17/8 per gallon contained in preparations other than medicinal, toilet and culinary preparations. (*ii*) that the two lists namely of purely medicinal preparations and preparations other than those for medicinal purposes, as they existed on 6th November, 1950, should not be changed by the State Governments unless modified and permitted by the Government of India. The following recommendations of the Excise Committee have, however, superseded these interim recommendations : (*a*) Since a very low rate of duty has been proposed all preparations should be manufactured under bond and if for certain branches of this industry manufacturing outside bond is indispensible and it has been the convention in a State to allow such manufactures, the price may continue but a higher rate of duty may be charged. (*b*) Institutions whose sole aim is advancement of science, should be allowed the privilege of obtaining alcohol free for scientific purposes. Reliable firms having well equipped research laboratories and manned by qualified scientific personnel deserve to get the concession if their activities are devoted to research and advancement of science.		

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	Where the conditions stated above are not fully satisfied, duty on rectified spirit may be levied at the concessional rate of Rs. 5 per proof gallon. (c) Government hospitals, dispensaries and other institutions maintained and recognised by the Government may also be supplied with rectified spirit and spirituous medicinal preparations free of duty. 7. *Special denaturants for specfic industries* : The State Governments have been asked to supply us with necessary information for prescribing the specifications of the denaturants for ordinary denatured spirit and for each kind of denatured spirit. A reference to the State Governments is being made in respect of the vend fees or other kinds of levies on denatured spirit. 8. *Suggestion for the abolition of vend fees by Bombay Government and of the town duty by the Bombay Municipal Corporation* : The levy of vend fees by the State Government or the levy of the town duty by the Bombay Corporation, is not a matter within the purview of the Central Government. A general reference to vend fees has, however, been made to all the State Governments.	XXXV p. 85-89 The Committee noted with satisfaction the action taken so far by the Central and the State Governments on the various recommendations of the Expert Committee (Excise). The Committee also noted that the matter was being pursued further.	XXXV p. 85-89. The Board noted.
XXXVI	*Subject* : **Symposia under the C.S.I.R.** The following proposals for holding Symposia during the year 1953-54 have been received. FROM THE CENTRAL GLASS AND CERAMIC RESEARCH INSTITUTE : 1. *Symposium on Quality Control in Glass Industry.* Date not specified. Unsatisfactory quality of glass articles coupled with high percentage of rejection at different stages of manufacture results in increased cost of production and reduction in capacity of Indian manufactured products to compete with foreign products. The C.G.C.R.I. has been studying the suitability of Indian glass containers for different industries, but without quality control it is difficult to assess the effectiveness of the results achieved. Efforts are to be made to bring home to the glass manufacturers the urgent need of quality control. Producers, consumers and scientists will be invited to participate. 2. *Symposium on Raw materials for the glass and ceramic industries.* Recently there have been complaints regarding the non-availabitity of good quality raw materials at reasonable prices for both glass and ceramic industries.		

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	It is necessary to carry out a careful analysis of the effect of these factors on the progress of the industry to formulate concrete proposals.		
	FROM THE PHARMACEUTICALS AND DRUGS RESEARCH COMMITTEE :		
	3. *Symposium on Antibacterial Substances from Soil, Plants and Other Sources* (in March 1953).		
	Soil, having a very rich microbiological flora is the natural medium for the development of antagonists like streptomycin, chloromycetin, aureomycin etc.		
	The scope of the symposium is—		
	(*i*) Microbiological studies of soils, plants etc. in general and Indian soils and plants etc. in particular.		
	(*ii*) Microbial antagonism.		
	(*iii*) Isolation of bacteria, fungi and actinomycetes, producing antibacterial substances—their chemical nature etc.		
	(*iv*) Testing and standardisation of such antibiotics including toxicity studies on experimental animals.		
	(*v*) Action and possible therapeutic uses of the antibacterial substances.		
	(*vi*) Possibilities of industrial exploitation of substances showing promising antibiotic properties.		
	Sir Alexander Fleming is expected to take part.		
	FROM THE ESSENTIAL OILS RESEARCH COMMITTEE.		
	4. *Symposium on Research and Development in Indian Essential Oils and Aromatic Chemicals* (In September-October 1953).		
	FROM THE NATIONAL CHEMICAL LABORATORY, POONA.		
	5. *Symposium on Neucleotides* (In July-August 1953).		
	Prof G.I.Finch has suggested that Prof. Todd, F.R.S. of Cambridge may be invited to visit India and stay in the N.C.L. for a month when this symposium could be held.		
	FROM THE SALT RESEARCH COMMITTEE.		
	6. *Symposium on Salt* (In April or May, 1953).		
	The Government Model Salt Farm, Wadala, has shown that salt of 98% purity can be manufactured by solar evaporation. Other salt manufacturers of Bombay State have also produced salt of the same purity. But salt manufacturers of other States are finding difficulty in producing salt of this standard.		
	The Symposium will be held during the peak production period of salt to bring home to the manufacturers and others interested, the problems confronting the salt industry.		

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	FROM THE FUEL RESEARCH INSTITUTE, JEALGORA : 7. *Symposium on Coal Washing* (in March 1953 for two days). Work on coal washing has been in progress at the Fuel Research Institute for the past five years. Coal washeries are being installed. The Coal Board is pressing for better qualities of coal and more uniformity in colliery output. The railways are recommending installation of coal washeries in large numbers to guarantee the quality of coal. Topics to be discussed are coal washers of the jig, gravity and rheolaveur types, froth flotation, cyclone and new forms and types of washers, and characteristics of Indian coals in so far as they affect the washability.		
	FROM THE BUILDING RESEARCH INSTITUTE : 8. *Symposium on Reinforced Concrete (in India) Today—Material, Design and Construction* (in November, 1953 for three days). One day each will be devoted to (*i*) theory and design (*ii*) materials of production and construction and (*iii*) special treatment and new developments. The whole field of concrete technology will be covered (plain concrete, reinforced concrete and pre-stressed concrete) to consider developments in this material in India only, during the last decade. The Symposium is expected to be of interest to Research Institutes, Universities and the building industry (contractors, engineers. consultants and designers). Architects are also expected to be interested.	XXXVI p. 89-93. The Committee recommended for approval the following proposals for holding symposia during the year 1953-54:— (*i*) Quality Control in Glass Industry by the Central Glass & Ceramic Research Institute at Calcutta. (*ii*) Antibacterial Substances from Soil, Plants, etc., by the Pharmaceuticals and Drugs Research Committee at Bombay. (*iii*) Indian Essential Oils and Aromatic Chemicals under the joint auspices of the Essential Oils Research Committee and the Forest Research Institute at Dehra Dun. (*iv*) Neucleotides by the N.C.L. at Poona. (*v*) Salt by the Salt Research Committee at Poona. (*vi*) Coal Washing by the Fuel Research Institute at Digwadih. (*vii*) Reinforced Concrete in India Today by the Building Research Institute at Roorkee. (*viii*) Non-ferrous Metal Industry in India by the National Metallurgical Laboratory at Jamshedpur. The Committee noted that as per directions of the Board the D.S.I.R. was in correspondence with the various scientific organisations in India with a view to avoiding duplication in holding symposia.	XXXVI p. 89-93. The Board endorsed the recommendation of its Committee.
	FROM THE METALS RESEARCH COMMITTEE : 9. *Non-ferrous Metals and Potentialities of Production in India—Uses and Present Supply Position.* 10. *Waste Materials from Metallurgical Industries.* The above two subjects were suggested for Symposia during the meeting of the Metals Research Committee held on the 29th December, 1952 when it was agreed that the National Metallurgical Laboratory, Jamshedpur, should organise the Symposia and the Acting Director, N.M.L. should select suitable subjects and inform the D.S.I.R. The Acting Director, N.M.L. has been requested to furnish particulars in this connection.		

PROCEEDINGS OF THE PHYSICAL RESEARCH COMMITTEE

Item No.	Particulars.
XXXVII	*Subject* : **Proceedings of the Physical Research Committee** (*Chairman* : *Prof. C.V. Raman*).

Synopsis :

1. A meeting of the Physical Research Committee was held on the 17th December, 1952 i Bangalore

2. NEW SCHEMES OF RESEARCH

(*i*) Development of Micro-wave Technique and its Application by Dr. K. Rangadham Rao, Andhra University.

The Committee noted that micro-wave research had been taken up at a number of labora tories in India and in particular in the National Physical Laboratory on dielectric behaviou in the region of micro-wave frequencies. The Committee also noted that the equipment state to be already available or expected shortly at the Andhra University should enable measuremen of dielectric constants in the region of high frequencies. Subject to the condition that th scheme was confined to this particular field, the Committee *recommended a contingent grant o Rs.* 1,000 *and a Junior Research Assistant* to Dr. Rangadhama Rao.

(Details of this scheme were considered at the meeting of the BSIR held an August 12 1952. Departmental action was recommended on receipt of expert opinion from the Physical 8 Radio Research Committees. Opinion of the Radio Research Committee is awaited.)

(*ii*) Fluorescence and Absorption Spectra of Organic Molecules by Dr. V. Ramakrishn Rao, Andhra University.

The Committee noted that equipment required for the scheme was available at the Andhra University and only some contingent grant was asked for. The Committee *recommended a grant of Rs.* 2,000 *for contingencies only.*

(The scheme has already been considered under Item No. III pages 3-5 of this agenda).

(*iii*) X-ray Diffraction Studies of Crystals by Dr. K. Banerjee, Allahabad University.

The Committee considered the reply by Dr. Banerjee to the enquiries made by the Chairman and *recommended the scheme for sanction with the following grant* :—

Equipment (rotation-oscillation X-ray camera to be constructed locally)	...	Rs. 1,500
Contingencies		
Staff (One Jr. Research Asstt.)	...	Rs. 500
	...	Rs. 2,640 (including allowances)
Total		Rs. 4,640 (including allowances)

(The scheme has already been considered under item No. VI page 11 of this agenda).

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
XXXVII. **Physical Research Committee.**	XXXVII. **Physical Research Committee.**
1. p. 95. The Committee noted.	1. p. 95. The Board noted.
2. (*i*) p. 95. The Committee noted that the Radio Research Committee had since recommended the research scheme (vide proceedings of Radio Research Committee under item 3 (*i*) pages 289-291). The Committee recommended that the Research Scheme on Development of Micro-wave Technique and its Application by Dr. K. Rangadhama Rao be approved and the following grant be made:— Equipment — Nil; Contingencies — Rs. 1,000; Staff: (1 J.R.A.) — Rs. 2,420 (including allowances.); Total — Rs. 3,420 (including allowances.)	2 (*i*) p. 95. The Board noted and endorsed the recommendation of its Committee.
(*ii*) p. 95. The Committee noted that the scheme had already been considered under Item III p. 3-5 of this agenda.	(*ii*) p. 95. The Board noted.
(*iii*) p. 95. The Committee noted that the scheme had already been considered under Item VI p. 11 of this agenda.	(*iii*) p. 95. The Board noted.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	(*iv*) Thermal Diffusion and Inter-Diffusion of Gases by Dr. B. N. Srivastava, Lucknow University. The Committee *recommended that the scheme may be restricted only to the discovery of laws of molecular interaction by experiments on inter-diffusion and thermal diffusion and recommended the grant of Rs.* 1,000 *under contingencies and a Junior Research Assistant.* (The scheme has already been considered under Item No. II pages 1-3 of this agenda).	(*iv*) p. 97. **The Committee noted that the scheme had already been considered under Item II p. 1-3 of this agenda.**	(*iv*) p. 97. **The Board noted.**
	(*v*) Improvement and Perfecting of the Unimeter by Dr. K. Kadambi, Forest Research Institute, Dehra Dun. The Committee was of the opinion that the appropriate course for the author would be to dispose of his rights in the instrument developed by him to some commercial firm and arrange with them for making improvements, its manufacture and sale. The *scheme was not recommended* for a grant-in-aid by the C.S.I.R. (This scheme has already been considered under Item No. V page 9 of this agenda).	(*v*) p. 97. **The Committee noted that the scheme had already been considered under Item V p.9 of this agenda.**	(*v*) p. 97. **The Board noted.**
	3. SCHEMES IN PROGRESS : (*i*) Investigations on Molecular Spectra by Dr. R. K. Asundi, Banaras Hindu University. The Committee *recommended the continuance of the scheme* for a period of one year (Two Jr. Res. Assistants and a contingent grant of Rs. 2,000).	3 (*i*) p. 97. **The Committee recommended renewal of the scheme with the following grant for 1953-54:—** Equipment — Nil Contingencies — Rs. 1,000 Staff: (2 J.R.A's) — Rs. 6,168 (including allowances.) Total — Rs. 7,168 (including allowances.)	3 (*i*) p. 97. **The Board endorsed the recommendation of its Committee.**
	(*ii*) Design and Development of Some Electrical Measuring Instruments by Shri N.M. Athavale, Poona. The Committee *recommended the continuance of the scheme* for a further period of one year and the payment of the grant applied for. The Committee also approved of the action taken by the Chairman with regard to the utilisation of the results obtained so far.	(*ii*) p 97. **The Committee recommended the scheme for continuance during 1953-54 with the following grant:** Equipment — Rs. 1,000 Contingencies — Rs. 2,000 Staff: (1 S.L.A.) — Rs. 2,518 (including allowances.) Total — Rs. 5,518 (including allowances.) **The Committee also recommended that the D.S.I.R. be authorised to examine the commercial possibilities of the instrument developed so far by Mr. Athavale.**	(*ii*) p. 97. **The Board endorsed the recommendations of its Committee.**
	(*iii*) Investigations of the Spectra of Molecules in Ultraviolet Regions by Dr. K. Mazumdar, Allahabad University. The Committee *recommended the renewal of the scheme* for a period of one year.	(*iii*) p. 97. **The Committee recommended the renewal of the scheme with the following grant :** Equipment — Nil Contingencies — Rs. 500 Staff: (1 J.R.A.) — Rs. 3,185 (including allowances.) Total — Rs. 3,685 (including allowances.)	(*iii*) p. 97. **The Board endorsed the recommendation of its Committee.**
	(*iv*) Production of Synthetic Saphires under the altered title "Production of Single Crystals of Alumina and Other Refractory Materials" by Dr. P.K. Kichlu, Delhi University. The Committee noted that the process used for synthetic crystals of refractory materials, such as alumina and titania was the same and that only the relatively inexpensive alumina found use in India in synthetic jewellery. The process itself was well known and was not covered by patents. The scheme had been in operation for well over 2 years and on a consideration of the actual outcome from it, the Committee did not feel convinced that any specific purpose, scientific or industrial, would be served by further work. The Committee *therefore did not recommend the scheme for renewal.*	(*iv*) p. 97. **The Committee noted that Dr. Kichlu had since requested that the Research Scheme be continued. The Committee considered this request and recommended that the scheme be continued with the following grant:—** Equipment: — Nil Contingencies: — Rs. 2,000 Staff: (1 J.R.A. 1 Mechanic 1 Lab. Att.) — Rs. 6,292 (including allowances.) Total — Rs. 8,292 (including allowances.)	(*iv*) p. 97. **The Board endorsed the recommendation of its Committee.**

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*v*) Crystal Growth by Dr. R.S. Krishnan, Indian Institute of Science, Bangalore. (*vi*) General Effect of Light on the Electrical Conductivity of Systems Activated by Various Types of Discharge by Dr. S.S. Joshi, Banaras Hindu University. The Committee *did not recommend these schemes* since the renewal applications were not received (The investigators have written to the D.S.I.R. requesting the termination of the schemes and departmental action has been taken).	(v) & (vi) p. 99. The Committee noted that departmental action had since been taken to terminate the Research Schemes of Dr. R. S. Krishnan and Dr. S. S. Joshi. The Committee endorsed the action taken.	(v) & (vi) p. 99. The Board approved the departmental action taken to terminate the Research Schemes of Dr. R. S. Krishnan and Dr. S. S. Joshi.
	(*vii*) Spectral Studies of Heterocyclic Aromatic Compounds by Dr. M.R. Padhye, Bombay University. The Committee *recommended the scheme for renewal* provided a renewal application was received later.	(vii) p. 99. The Committee noted that the renewal application of the scheme had since been received. It was recommended that the scheme be renewed with the following grant for 1953-54 :— Equipment ... Nil Contingencies ... Rs. 750 Staff: ... Rs. 3,084 (including allowances.) (1 J. R. A.) Total Rs. 3,834 (including allowances.)	(vii) p. 99. The Board noted and endorsed the recommendation of its Committee.
	4. Scheme on Doppler Effect in Positive Rays by Dr. B. Dasannacharya, Banaras Hindu University. The Committee *did not recommend the revival of this scheme.*	4. p. 99. The Committee endorsed the recommendation of the Research Committee.	4. p. 99. The Board endorsed the recommendation of the Research Committee.
	5. *Request* from Dr. G.B. Deodhar for equipment. Dr. Deodhar, Allahabad University, had written to the Chairman for a suitable grant to purchase a powerful transformer with a rectified output, an X-ray spectrograph and a microphotometer to enable him to carry on research on the forbidden lines in X-ray spectra. After discussion the Committee *did not support the request of Dr. Deodhar.*	5. p. 99. The Committee endorsed the recommendation of the Research Committee.	5. p. 99. The Board endorsed the recommendation of the Research Committee.
XXXVIII	*Subject*: **Proceedings of the Chemical Research Committee** (*Chairman, Dr. K. Venkataraman*). *Synopsis*: 1. A meeting of the Chemical Research Committee was held on the 3rd November 1952 at Bombay.	XXXVIII : **Chemical Research Committee.** 1. p. 99. The Committee noted.	XXXVIII. **Chemical Research Committee.** 1. p. 99. The Board noted.
	2. ARISING OUT OF THE MINUTES OF THE LAST MEETING : *Artificial abrasives :* The Chairman stated that the recommendation of the Committee had been referred to the Central Glass & Ceramic Research Institute. Dr. L.A. Bhatt suggested that his observation that abrasive paper was being manufactured by two Indian firms and that they may be contacted, may be recorded.	2. p. 99. The Committee noted that the question of making artificial abrasives in India was now under the consideration of the National Metallurgical Laboratory.	2. p. 99. The Board noted.
	3. SCHEMES IN PROGRESS : (*i*) Studies in the Synthesis, Constitution and Dyeing Properties of Dyes with Special Reference to Anthraquinonoid and Sulphurised Vat Dyes by Dr. K. Venkataraman, Bombay.		

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	The Chairman explained that his writing a book on the Chemistry of Synthetic Dyes was incidental. He had received valuable assistance from the Research Assistants working in the scheme and the book incorporated some of their experimental results. Reference was also made to the series of papers, which recorded important advances in our knowledge of the constitution, chromatography and other aspects of anthraquinonoid dyes. The scheme was *recommended for renewal* for the year 1953-54.
	(*ii*) Electrolytic Oxidation of Organic (Aromatic) Chemicals by Dr. B.B. Dey, Madras.
	The Chairman explained that valuable fundamental data on electrolytic oxidation of organic compounds were being obtained. Mr. Datar hoped that the experiments would be carried to the pilot plant stage The scheme was *recommended for renewal.*
	(*iii*) Investigation of the Reaction Kinetics of the Vapour Phase Thermal Decomposition of Mercury and Zinc Dimethyls by Dr. L M. Yeddanapalli, Madras.
	There was no application from Dr. Yeddanapalli for renewal. The report indicated that the work was incomplete and that Dr. Yeddanapalli had a programme of extension. Dr. Joshi supported renewal of the scheme, since otherwise the work carried out so far would be wasted. The Committee *recommended renewal if an application for renewal was subsequently received.*
	(*iv*) Halogenation of Organic Compounds under Electric Discharge by Dr. S.S. Joshi, Banaras.
	Dr. Joshi explained that he was unable to proceed with the scheme since a Research Assistant with suitable qualifications was not available and he was anxious that the funds should not be wasted. In reply to Prof. Finch, Dr. Joshi explained that moderate pressures were be ing used. The Committee *recommended the scheme* with a Research Assistant in the senior scale.
	(*v*) Pilot Plant scheme for Preparation of Ether and Ethylene from Alcohol by Dr. D.N. Daruvalla, Sri Ram Institute, Delhi.
	The scheme had not started. In view of its importance it was *recommended that the funds* recommended earlier *be made available during the year* 1953-54. Sri Ram Institute may concentrate on the production of ether from ethyl alcohol and N.C.L. on the production of ethylene and its derivatives. Prof. Finch and Dr. Shah mentioned that some progress had been made in the preparation of the catalyst, and that the main part of the work under the scheme would be taken up shortly. Dr. Krishna suggested that Prof. Finch or his nominee from the N.C.L. should meet Dr. Daruvalla and discuss the entire programme so that complete *co-ordination may be secured.*
	(*vi*) Preparation of Research Chemicals for India by Director, National Chemical Laboratory, Poona.
	The Committee was of the view that the scheme was important and the progress of work

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
3 (i) p. 99-101 The Committee recommended renewal of the Research Scheme on Sulphurised and Anthraquinonoid Dyes with the following grant for 1953-54 :— Equipment ... Nil Contingencies ... Rs. 4,000 Staff: .. Rs. 13,585 (including allowances.) (4 J. R. A's) Total Rs. 17,585 (including allowances.)	3 (i) p. 99-101. The Board endorsed the recommendation of its Committee.
(ii) p. 101. The Committee noted that Dr. B.B. Dey had since joined the Central Electro Chemical Research Institute as its Director and he had requested that the scheme be terminated. Renewal of the scheme was, therefore, not recommended.	(ii) p. 101. The Board noted and endorsed the recommendation of its Committee.
(iii) p. 101. The Committee noted that Dr. Yeddanapalli had since written to the D.S.I.R. that no renewal of the scheme was needed and that the D.S.I.R. had taken departmental action to terminate the scheme. The Committee endorsed the action taken.	(iii) p. 101. The Board noted and endorsed the action taken by the D.S.I.R.
(iv) p. 101. The Committee recommended that the Research Scheme on Halogenation of Organic Compounds by Dr. S.S. Joshi be renewed and the following grant be made for 1953-54 :— Equipment ... Nil Contingencies ... Rs. 500 Staff: ... Rs. 3,780 (including allowances.) (1 S.R A.) Total Rs. 4,280 (including allowances.)	(iv) p. 101. The Board endorsed the recommendation of its Committee.
(v) p. 101. The Committee noted that work on the scheme had not started yet. The Committee recommended the regrant of the funds sanctioned for the year 1952-53. The Committee also recommended that Dr. Daruvalla be requested to discuss the programme of work in the scheme with the Director, N. C. L. to secure proper co-ordination with the work underway in the N.C.L.	(v) p. 101. The Board noted and endorsed the recommendations of its Committee.

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	should be expedited. The *following recommendations were made.* (*a*) The scheme should be simple and flexible, so that an immediate beginning may be made with the facilities available in various institutions in India. The research chemicals to be covered by the scheme need not be restricted to the list prepared by Dr. Kelkar but any chemical, a laboratory was prepared to offer, may be made available to the purchasers. Purchasers should also be informed if the chemicals required by them were already being manufactured commercially in India. Analytical reagents might also be included in the scheme if there are laboratories prepared to supply them and guarantee their purity according to specifications. Chemicals will normally be prepared only against orders, but laboratories which have chemicals in stock and are prepared to offer them for sale may communicate with the Director, N.C.L. (*b*) Chemicals should be sold at the lowest prices listed in the catalogues of well-known Americans, British and German manufacturers, adding 35% to American catalogue prices and 25% to British and German catalogue prices. This will provide a certain margin to the laboratories preparing the chemicals and at the same time make the chemicals available to the consuming laboratories at prices slightly lower than those of imported chemicals. (*c*) However, if a laboratory found that the actual cost of production was in excess of the calculated figure, the laboratory may make an application to the Director, N.C.L. for a grant to cover the difference, giving full details of the cost of raw materials, labour, etc. The Director, N.C.L. will scrutinise and make his recommendation to the C.S.I.R. (*d*) The responsibility for the purity of the chemicals should normally be that of the supplying laboratory. At the request of the supplier or the consumer, however, the N.C.L. should undertake the testing of the chemicals for the melting point or boiling point. Other tests need be undertaken only in special cases. It will be open to buyer, provided he pays the additional cost, to ask for the entire quantity of a chemical to be supplied through the N.C.L., who will then undertake the responsibility for sampling, testing and repacking. The responsibility for matters concerning the preparation of chemicals, including the purchase of raw materials, payment to the staff employed and bottling, will be left to the laboratories undertaking the preparation. The financial commitment of the C.S.I.R. will at present be restricted to the grant to be made to the N.C.L. for running the scheme. The provision to be made for the year 1953-54 will be Rs. 15,500 which will include the salaries of the J.S.O. and a stenotypist, as well as contingencies. (*e*) It was left to the Director, N.C.L. to work out further details, contact the laboratories which will make or purchase chemicals, and issue notifications from time to time in the C.S.I.R. News.

Recommendations of the Committee of the Board.	Recommendations of the Board.
(vi) p. 101-103. The Committee recommended that the scheme for Preparation of Research Chemicals be renewed with the following grant for the year 1953-54 : Equipment ... Nil Contingencies ... Rs. 500 Staff : ... Rs. 5,290 (including allowances.) Total Rs. 5,790 (including allowances.) The Committee noted that work under the scheme was slow and recommended that the Director, N.C.L. be requested to expedite the work. The Committee also endorsed the recommendations of the Research Committee as to the lines on which the scheme should function.	(vi) p. 101-103. The Board endorsed the recommendation of its Committee.

Item No.	Particulars.
	4. NEW SCHEMES: (i) Further Studies on Refrachor by Dr. S.S. Joshi, Meerut. Prof. Finch wished to know if Dr. Joshi had explained the fundamental basis of the refrachor. The Chairman said that as far as he was aware, the refrachor had no theoretical basis and merely represented an empirical constant. The scheme was *not recommended* for sanction. (ii) Mutual Solubilisation of Oil and Water by Prof. Shanti R. Palit, Calcutta. (This scheme was considered by the B.S.I.R. in their meeting held on the 19th March 1952. The opinion of the Chemical Research Committee was awaited and the D.S.I.R. was authorised to take departmental action.) The Chairman said that the proposed investigation by Prof. Palit was both of scientific and technical importance, and the pioneering work already carried out by him justified support. Dr. Joshi was in favour of recommending the scheme provided it did not contravene the general rule that no investigator should be in charge of more than two schemes. *Subject to this condition the scheme was recommended* without the provision for a Laboratory Assistant. On enquiry from Dr. Bhatt, Dr. Krishna stated that there was no fixed allocation to the Chemical Research Committee but all the schemes recommended by the Committee will be considered on their merits by the B.S.I.R. It was open to the Chemical Research Committee to lay down an order of priority for the schemes they recommended. (iii) Preparation of Sulphur—Recovery of Sulphur as Hydrogen Sulphide from Sulphates by Dr. G.P. Kane, Department of Chemical Technology, Bombay. [It is proposed to utilise the reaction between reduced calcium sulphate and magnesium chloride solution for the recovery of sulphur as hydrogen sulphide. Work on pilot plant scale will show whether sulphur may be recovered from the hydrogen sulphide by the Claus Chance process or whether the hydrogen sulphide can be used in the production of sulphuric acid. The different steps in the process are (a) Precipitation of calcium sulphate from bitterns by the addition of calcium chloride (recovery of gypsum, 90%). (b) Reduction of calcium sulphate to calcium sulphide (reduction of 90%). (c) Treatment of calcium sulphide with magnesium chloride obtained as bitterns and steam to yield hydrogen sulphide and calcium chloride required in step (a) (recovery of H_2S, 90%) Dr. Kane has estimated the cost of production of one ton of hydrogen sulphide at Rs. 194 by this process (0.94 tons of sulphur). Dr. Kane has requested for an Equipment grant of Rs. 15,000, Contingent grant of Rs. 5,00 and two Research Assistants, One Laboratory Assistant and One Hamal for one year under Staff.]

Recommendations of the Committee of the Board.	Recommendations of the Board.
4 (i) p. 105. The Committee did not recommend the scheme for a grant.	4 (i) p. 105. The Board did not recommend the scheme for a grant.
(ii) p. 105. The Committee recommended that the Research Scheme on Mutual Solubilisation of Oil & Water be approved. The Committee noted that Dr. S. R. Palit was already in charge of three schemes of the C. S. I. R. The Committee, therefore, recommended that work on the new scheme be taken up only after one of the three current schemes was terminated. The Committee recommended that the D. S. I. R. be authorised to sanction necessary funds for the new scheme when it was taken up	(ii) p. 105. The Board noted and endorsed the recommendations of its Committee.

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	Dr. Kane (present by invitation) explained the scheme. Members were in favour of the scheme which would lead to an alternative source of sulphur. Dr. Kane stated that he hoped to complete the work within a year. The *scheme was recommended* with one Research Assistant (if necessary on the senior scale). Dr. Kane may appoint a temporary hamal, if necessary, and pay his salary out of contingencies.
	(*iv*) Development of Microwave Technique and its Applications by Dr. Rangadhama Rao, Waltair.
	(*a*) Investigation of the dielectric properties of organic long chain compounds with particular reference to transitional stages (i.e. solid to liquid transition).
	(*b*) Investigation of the radio frequency absorption spectra of solution of electrolytes in the above said frequencies.
	Since the work under the scheme during the first year or two would consist in the development of the necessary technique, the Committee recommended that the scheme need only *be considered by the Physical Research Committee*.
	(The scheme has already been considered under Item No. XXXVII 2.(*i*) page 95 of this agenda).
	(*v*) Investigation on Economic Utilisation of Tamarind Seed by Dr. A.N. Puri, Bombay.
	The Chairman explained the work that has already been carried out at Dehra Dun, Bombay and elsewhere and gave figures of production and consumption of tamarind seed powder obtained from the Textile Commissioner. The Government intended to enforce compulsory use of tamarind kernal powder to the extent of 50 per cent. Dr. Krishna stated that the important problems to be investigated by Dr. Puri, were bleaching of the powder and removal of the fat content to enable its being ground to the fineness desired by the textile industry. Dr. Puri had in mind a simple process not involving elaborate equipment. Dr. Bhatt said that the seed contained 5-6 per cent of fatty oil which could be recovered and used. Dr. Krishna mentioned that the laboratory facilities with Dr. Puri were limited and it will be an advantage for Dr. Puri to collaborate with the Department of Chemical Technology. The Chairman agreed to discuss the problem further with Dr. Puri as well as the heads of the Textile Chemistry and Oil Sections of the Department of Chemical Technology and then request Dr. Puri to submit a modified scheme indicating clearly the specific programme of work.
	(The scheme has already been considered under Item No. XII pages 25-29 of this agenda).
	(*vi*) Fluorescence and Absorption Spectra of Organic Molecules by Dr. V. Ramakrishna Rao, Waltair.
	Since similar researches were in progress under the Physical Research Committee, it was recommended that Dr. Rao's scheme might also *be referred to the Physical Research Committee*.
	(The scheme has already been considered under item No. III pages 3-5 of this agenda).

Recommendations of the Committee of the Board.	Recommendations of the Board.
(*iii*) p 105-107. The Committee recommended that the Research Scheme on Recovery of Sulphur from Sulphates by Dr. G.P. Kane be approved and the following grant be sanctioned: Equipment Rs. 5,000 Contingencies Rs. 2,000 Staff: Rs. 3,245 (including allowances.) (1 J.R.A. on Rs. 200 p.m.) Total Rs. 10,245 (including allowances.)	(*iii*) p. 105-107. The Board endorsed the recommendations of its Committee.
(*iv*) p. 107. The Committee noted that the scheme had already been considered under Item XXXVII 2. (*i*) p. 95 of this agenda.	(*iv*) p. 107. The Board noted.
(*v*) p. 107. The Committee noted that the scheme had already been considered under Item XII p. 25-29 of this agenda.	(*v*) p. 107. The Board noted.
(*vi*) p. 107. The Committee noted that the scheme had already been considered under Item III p. 3-5 of this agenda.	(*vi*) p, 107. The Board noted.

PROCEEDINGS OF THE CHEMICAL RESEARCH COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*vii*) Atomization—Production of Finely Divided Sprays of Fluids by Dr. Narasing Rao, Waltair. The Committee *did not recommend the scheme* for sanction. (The scheme has already been considered under item No. VIII pages 15-17 of this agenda).	(*vii*) p. 109. The Committee noted that the scheme had already been considered under Item VIII p. 15-17 of this Agenda.	(*vii*) p. 109. The Board noted.
	(*viii*) Occurrence and Utilisation of Dolomites by Dr. Narasinga Rao and Prof C. Mahadevan. The Committee *did not recommend the scheme* for sanction. (The scheme has already been considered under item No. IX pages 17-19 of this agenda).	(*viii*) p. 109. The Committee noted that the scheme had already been considered under Item IX p. 17-19 of this Agenda.	(*viii*) p. 109. The Board noted.
	(*ix*) New Paths to Chloramphenicol by Dr. Amin Tyabji, Bombay. The Chairman informed that a scheme on chloramphenicol was in progress under the auspices of the Drug Research Committee. It was recommended that the scheme *be referred to the Drug Research Committee.* (The scheme has already been considered under Item No. XIX pages 41-43 of this agenda).	(*ix*) p. 109. The Committee noted that the scheme had already been considered under Item XIX p. 41-43 of this Agenda.	(*ix*) p. 109. The Board noted.
	5. PILOT PLANT FOR CALCINATION OF LIMESTONE AT N.C.L., POONA. There was general discussion on the scheme which involved a capital expenditure of Rs. 3,31,340 for equipment. Prof. Finch was of the view that much more preliminary work with particular reference to the physical and chemical character of limestone was necessary before pilot plant work could be undertaken. He deprecated the tendency to proceed to the pilot plant stage without carrying out adequate laboratory investigation. One of the properties of limestone to be studied was its porosity When lime is to be used for the manufacture of bleaching powder the presence of trace elements may play a vital part in the stability of the bleaching powder. Dr. Bhatt stated that the object of the scheme should be to supply industries with chemically pure lime. Prof. Finch suggested that the scheme in its present form need not be considered at this stage. He undertook to initiate a programme of work on the physical and chemical properties of authentic samples of limestone. The work to be carried out at the N.C.L. was, however, contingent on the Geological Survey of India or other competent authority supplying authentic samples. The samples should be genuine and represent a source from which large quantities of limestone would be available. The Committee agreed with Prof. Finch and it was *recommended that no provision need be made in the budget during* 1953-54.	5. p. 109. The Committee endorsed the recommendation of the Research Committee. The Committee noted that a number of samples of limestone received from various localities were being studied at the National Chemical Laboratory.	5. p. 109. The Board endorsed the recommendation of the Research Commitee. The Board noted.
	6. BUDGET PROPOSALS FOR THE YEAR 1953-54. The Committee agreed to the provision of a part-time stenographer, a part-time Technical Assistant and contingencies. The Director, N.C.L. agreed to the transfer of the Technical Assistant to the N.C.L. Dr. Mata Prasad suggested that the stenographer might apply for the post of stenographer in the Salt Research Laboratory, Bhavnagar.		

PROCEEDINGS OF THE MALARIA CHEMOTHERAPY COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	The Committee also approved the suggestion of the Chairman, that the Senior Research Assistant in the scheme on dyes in his laboratory might carry out the duties of the Technical Assistant to the Committee.	6. p. 109-111. The Committee noted that necessary action on the recommendation of the Research Committee had already been taken departmentally.	6. p. 109-111. The Board noted.
	7. SCOPE AND FUNCTIONS OF THE CHEMICAL RESEARCH COMMITTEE. (*a*) Dr. Krishna stated that the suggestions from the Central Office may be modified by the Committee. The functions of the Committee as defined in the suggestions were broadly approved with the clear understanding that there was no question of the Committee controlling chemical research in the universities or elsewhere. (*b*) Dr. Krishna suggested that, apart from considering schemes submitted by investigators, the Committee, may, on its own initiative, undertake schemes of research connected with the development of industries, and allocate them to suitable laboratories. (*c*) Dr. Bhatt suggested that copies of proceedings of the C.S.I.R. may be made available to members of Research Committees. Dr. Krishna said that this may be considered. (*d*) Regarding a survey of the facilites available in the country for chemical research, the Chairman said that all the necessary data were available in the office of the C.S.I.R. and the Ministry of Education.	7. p. 111. The Committee noted.	7. p. 111. The Board noted.
	8. PILOT PLANT FACILITIES AVAILABLE IN INSTITUTIONS IN INDIA. The data on pilot plants available in the country collected by Prof. McBain had been circulated to the members of the Chemical Research Committee. Dr. Krishna stated that the Planning Commission required full information regarding the pilot plant facilities available in various laboratories in order to arrange for their fullest use and to avoid duplication.	8. p. 111. The Committee noted.	8. p. 111. The Board noted.
XXXIX	*Subject*: **Proceedings of the Malaria Chemotherapy Committee.** *Synopsis* : 1. A meeting of the Malaria Chemotherapy Committee was held on the 6th January, 1953 in Lucknow. 2. The Committee considered the replies received from the Cinchona Plantations Mungpoo and Neduvattum, regarding the total output of totaquine and cinchona febrifuge. The Committee noted with regret that the demand for totaquine and cinchona febrifuge had been poor	XXXIX. **Malaria Chemotherapy Committee.** 1. p. 111. The Committee noted.	XXXIX. **Malaria Chemotherapy Commttee.** 1. p. 111. The Board noted.

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	with the result that there had been an accumulation of stocks. In view of the National Malaria Control Programme the expected reduction in the prevalence of malaria in the country and the demand for antimalarial drugs, it was more than likely that the present output of quinine and its products by the two plantations in the country will be far in excess of the actual demand unless effective steps were taken, as a matter of policy, to encourage the use of quinine and its products in the treatment of malaria, by the Government of India and the various State Governments. The Committee *recommended that all the Governments in the country make special efforts to utilise quinine and its products* which were readily available within the country and were eminently satisfactory in the treatment of malaria in various hospitals and dispensaries and in the rural areas. The Committee *recommended that, if necessary, restrictions should be imposed on the importation of foreign quinine and synthetic antimalarial drugs.* Such a step will be vitally necessary for the country's economy and future needs with a view to maintain cinchona plantations specially in case of international hazards. The Committee further *recommended that the two plantations should be requested to examine the cost of production in order to lower the sale price of quinine and its products.*	2. p. 111-113. The Committee recommended that— (i) the Ministries of Health in the Centre and the States and the All-India Medical Council be requested to encourage the use of indigenous quinine products and other antimalarials manufactured in India as far as possible, (ii) the Government of India be requested to restrict adequately the import of anti-malarials, and (iii) the two quinine producing centres in India be requested to examine their cost of production with a view to lowering it. The Committee further recommended that the D.S.I.R. be requested to arrange for the study of more economical production of quinine in India and also its extraction from the leaves and stem of the plant.	2. p. 111-113. The Board endorsed the recommendations of its Committee.
	3. RESULTS OF THERAPEUTIC TRIALS OF ANTIMALARIAL DRUGS. The Committee recorded that sufficient data was already available to recommend the comparative therapeutic efficacy of different anti-malarials available in the market.	3. p. 113. The Committee noted.	3. p. 113. The Board noted.
	4. COL. JASWANT SINGH'S PROPOSAL REGARDING THE LINES OF RESEARCH ON ANTIMALARIAL DRUGS ANDTHEIR DEVELOPMENT IN INDIA. On the earlier recommendation of the Committee, Col. Jaswant Singh reported that the Army Authorities had already taken up field trials with quinine and one drug of the 8-aminoquinoline series with a view to finding out the relapse range of the treated cases following treatment with these drugs. Considerable amount of data had already been collected and were being satistically analysed. The report would be available in the near future. Col. Jaswant Singh further suggested field trials in:- (a) an area where intensive control had been carried out by DDT; and (b) an area in the centre of hills where there were no chances of fresh infection. He further said that large scale field trials will also be attempted in other areas so that a complete picture of the effectiveness of these drugs for the prevention of relapses would be available in due course. Col. Jaswant Singh was requested to furnish the data at the next meeting.	4. p. 113. The Committee recommended that Col. Jaswant Singh be requested to furnish the results of the field trials by the Army authorities to the Malaria Chemotherapy Committee for consideration at its next meeting.	4. p. 113. The Board endorsed the recommendation of its Committee.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	5. RESEARCH SCHEMES : The Committee *recommended the renewal of the following schemes* for 1953-54. (*i*) Biological Studies on Malarial Parasites: Dr. U.P. Basu, Calcutta. Equipment ... Nil Contingencies ... Rs. 500 Staff ... Rs. 4,892 (including allowances) Total Rs. 5,392 (including allowances) (*ii*) Biological Studies on Malarial Parasites: Dr. R.N. Chaudhuri, Calcutta. Equipment ... Nil Contingencies ... Rs. 750 Staff Rs. 6,561/12/- (including allowances) Total Rs. 7,311/12/- (including allowances) The Committee did not recommend an equipment grant of Rs. 500 asked for by Dr. R.N. Chaudhuri for a "Rocker". This should be obtained from the School of Tropical Medicine. (*iii*) Preparation of 8-Aminoquinoline Derivatives as Possible Antimalarials: Dr. U.P. Basu, Calcutta. Since the position with regard to the metabolite of 8-aminoquinoline derivatives was not clear at present, it was considered by the Committee that no useful purpose would be served by continuing this scheme. (This may be considered under Item No. XL.2(*iii*) page 117 of this agenda). (*iv*) Screening of Antimalarial Drugs : Col. Jaswant Singh, Delhi. The Committee *recommended the renewal of this enquriy* for a further period of one year. The following grant was recommended :— Equipment (Unspent balance of 1952-53) Contingencies ... Rs. 7,000 Staff ... Rs. 12,024 (including allowances) 1 Senior Scientific Assistant. 2 Senior Lab. Assistants 1 Junior Lab. Assistant 2 Lab. Attendants Total Rs. 19,024 (including allowances)	5. (*i*) & (*ii*) p. 115. The Committee recommended continuance of the Research Schemes on Biological Studies on Malarial Parasites during 1953-54 for which the following grants be made: TO DR. U.P. BASU: Equipment Nil Contingencies Rs. 500 Staff Rs. 4,917 (including allowances.) (1 J.R.A. & 1 J.L.A.). Total Rs. 5,417 (including allowances.) TO DR. R.N. CHAUDHURI: Equipment Nil Contingencies Rs. 750 Staff: Rs. 6,557 (including allowances.) (1 S.R.A. & 1 J.L.A.). Total Rs. 7,307 (including allowances.) (*iii*) p. 115. The Committee noted that the subject would be considered under Item XL. 2 (*iii*) p. 117 of the agenda. (*iv*) p. 115. The Committee recommended the following renewal grant for the Research Scheme on Screening of Antimalarial Drugs for the year 1953-54, Equipment Unspent balance Contingencies Rs. 5,000 Staff: Rs. 10,524 (including allowances.) (1 S.R.A., 2 S.L.A's & 2 Lab. Att:) Total Rs. 15,524 plus unspent balance under "Equipment".	5 (*i*) & (*ii*) p. 115. The Board endorsed the recommendation of its Committee. (*iii*) p. 115. The Board noted. (*iv*) p. 115. The Board endorsed the recommendation of its Committee.

PROCEEDINGS OF THE PHARMACEUTICALS AND DRUGS RESEARCH COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
XL	*Subject* : **Proceedings of the Pharmaceuticals and Drugs Research Committee.** (*Chairman* : *Col. R.N. Chopra*). *Synopsis* : 1. A meeting of the Pharmaceuticals & Drugs Research Committee was held on the 7th January 1953 at Lucknow. 2. SCHEMES IN PROGRESS : (*i*) Survey, Cultivation and Improvement of the Quality of Medicinal Plants by Col. R.N. Chopra. The Committee noted that Col. R.N. Chopra had submitted a new scheme on a comprehensive scale as recommended at the last meeting of the Research Committee and had not sought the renewal of this scheme. The Committee recommended the reappropriation of Rs. 885/2/- from the head 'Equipment' to the head 'Contingencies' during the current year. (*ii*) (*a*) Biological Studies on Malarial Parasites by Dr. U.P. Basu. (*b*) Biological Studies on Malarial Parasites by Dr. R.N. Chaudhuri. The Research Committee endorsed the recommendation of the Malaria Chemotherapy Committee. (The schemes have already been considered under Items No.5 (*i*) & (*ii*) page 115 as part of the Proceedings of the Malaria Chemotherapy Committee). (*iii*) Preparation of 8-aminoquinoline derivatives as possible antimalarials by Dr. U.P. Basu. The Committee noted that the Malaria Chemotherapy Committee had recommended the termination of the scheme (*vide* Item No. 5 (*iii*) page 115 of this agenda). On this Dr. U P. Basu requested the continuance of the scheme for 6 months to enable him to bring the work to conclusion. The Research Committee recommended that the scheme may be continued till the end of August when Dr. Basu should send a consolidated report and also send the derivatives prepared by him to Col. Jaswant Singh for biological testing. (*iv*) Synthesis of Citrinin and its Derivatives by Dr. K. Venkataraman. The Committee did not recommend the renewal of the scheme. (*v*) Survey of Fungus Flora of India for Antibiotics by Dr. S.R. Bose. A sum of Rs 57,979 had been spent on the scheme since 1949. A large staff was there specifically for the object of carrying out quick screening of the fungus flora. The Committee noted with regret that during the three years only 16 items had been screened. The only item which showed promise was Psalliote campestris, a common European fungus. Request of the	XL. **Pharmaceuticals & Drugs Research Committee.** 1. p. 117. The Committee noted. 2. (*i*) p. 117. The Committee endorsed the action already taken departmentally to terminate the Research Scheme. (*ii*) p. 117. The Committee noted that the scheme had already been considered under item 5 (*i*) & (*ii*) p.115 of this Agenda. (*iii*) p. 117. In order to enable Dr. U.P. Basu to bring the work to conclusion the Committee recommended that the Research Scheme on 8-Aminoquinoline derivatives be renewed for a period of six months only with the following grant: Equipment Nil Contingencies Rs. 500 Staff: Rs. 5,784 (including allowances.) (1 S.R.A. & 2 J.R.A's). Total Rs. 6,284 (including allowances.) (*iv*) p. 117. The Committee noted that Dr. Venkataraman had since requested that the Research Scheme be continued till a decision was taken on the new scheme on Biosynthesis of Citrinin (vide Item XX page 43-45 of this Agenda). The Committee recommended the following grant for continuance of the scheme for 3 months only. Equipment Nil Contingencies Rs. 200 Staff: (1 JRA). Rs. 805 (including allowances.) Total Rs. 1,005 (including allowances.)	XL. **Pharmaceuticals & Drugs Research Committee.** 1. p. 117. The Board noted. 2. (*i*) p. 117. The Board endorsed the action already taken departmentally to terminate the Research Scheme. (*ii*) p. 117. The Board noted. (*iii*) p. 117. The Board endorsed the recommendation of its Committee. (*iv*) p. 117. The Board noted and endorsed the recommendation of its Committee.

Item No.	*Particulars.*
	C.S.I.R. for sending the material to the Microbiological Research Centre, Bombay, for further examination also had not been followed. The Committee recommended the renewal of the scheme only upto August 1953 when a detailed report should be submitted. (*vi*) Chemical Investigation of Indian Lichens by Prof. T.R. Seshadri. The Research Committee recommended the extension of the scope of the scheme to certain heart woods and for that purpose a Senior Laboratory Assistant. The scheme was recommended for renewal. (*vii*) Synthesis of Kellin, its Isomers and Related Compounds by Prof. T.R. Seshadri. The Committee recommended the continuance of the scheme upto August 1953 only when Prof Seshadri may submit a detailed report. (*viii*) Synthesis of new types of Insecticides by Prof. T.R. Seshadri. The Committee recommended the continuance of the scheme for one more year. The Committee also recommended an additional grant of Rs. 500 under contingencies for the current year. (*ix*) Biological Assaying of Insecticides by Col. Jaswant Singh. The Committee recommended the renewal of the scheme with two Senior Laboratory Assistants. (*x*) Screening of Antimalarial Drugs by Col. Jaswant Singh. The Committee endorsed the recommendation of the Malaria Chemotherapy Committee (The scheme has been considered under Item No. 5 (*iv*) page 115 of this agenda along with the Proceedings of the Malaria Chemotherapy Committee). (*xi*) Chemical and Pharmacological Investigations on Some Reputed Cardiac and Uterine Drugs of Indigenous Materia Medica by Dr. B.N. Ghosh. The Committee recommended the renewal of the scheme and requested Dr. B.N. Ghosh to bring the work to conclusion during 1953-54. (*xii*) Preparation of Cortisone and Corticosterone Analogues and its Derivatives by Dr. D.K. Banerjee. The Committee recommended that the scheme be concluded during 1953-54 for which renewal was recommended The compounds may also be sent to the Central Drug Research Institute for testing. (*xiii*) Chloramphenicol (Chloromycetin) and its Derivatives by Dr. B.D. Tilak. The Committee recommeded that Dr. B.D. Tilak be requested to bring the scheme to conclusion by end of August 1953.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
(*v*) p. 117-119. The Committee recommended continuance of the Research [illegible]	(*v*) p. 117-119. The Board endorsed the recommendation of its Committee.
	(*vi*), (*vii*), (*viii*), (*ix*), (*x*), (*xi*), (*xii*) & (*xiii*) p. 119. The Board endorsed the recommendations of its Committee.

Item No.	*Particulars.*
	In this connection, the Committee considered that research work in India on the [illegible] of various chemotherapeutic drugs even though may be successful may not be useful as the processes developed might have been already patented by foreign manufacturers. The Committee was of the opinion that for the progress of synthetic drug research and drug industry in India, Indian Patent Law was a great hindrance. The Committee recommended that the C.S.I.R. may find ways and means by which this difficulty may be overcome. (*xiv*) Compilation of Brochure on Indigenous Drugs of India by Dr. B. Mukerji. The Committee noted that Part I of the Brochure "Indian Pharmaceutical Codex" had already been published. The Committee noted that the scope of the work had much widened and recommended that this Brochure be titled as a "Handbook of Indigenous Drugs of India". (*xv*) Antibiotic Research Centre by Col. S.S. Bhatnagar, Bombay. The Committee recommended the continuance of the scheme. In this connection the Committee discussed the difficulties experienced by research institutions in obtaining organic solvents. The Committee recommended to the C.S.I.R. to bring to the notice of the Central and State Governments the harmful results on medical research and pharmaceutical industry of the existing restrictions and the prohibitive taxation on organic solvents such as non-potable alcohols (methanols, isopropyl and butyl alcohols). The Committee also recommended that Government should afford facilities such as making available of industrial ethyl alcohols duty-free. (*xvi*) Microbiological Research Centre by Col. S.S. Bhatnagar. The Committee recommended the continuance of the scheme for one year, Further continuance would depend upon the availability of additional space in his Laboratory. (*xvii*) Preparation of a Polyvaccine for Cholera, Typhoid and Dysentery by Dr. S.P. Gupta. The Committee recommended renewal of the scheme. (*xviii*) Chemical Investigation of Indian Cardiac Drugs by Dr. S. Rangaswami. (*xix*) Survey of Medicinal and Economic Plants of Ladakh by Col. R.N. Chopra. The Committee recommended the renewal of the scheme. 3. NEW RESEARCH SCHEMES: (*i*) Investigation for Fnding a Rich Source of Stigmasterol and Devising a Method for its Isolation Suitable for Commercial Exploitation by Dr. R.N. Chakravarthi. The Committee recommended the scheme for sanction with the following grant:- Equipment. ... Nil Contingencies ... Rs. 1,000 Staff: — Rs. 3,060 (including allowances.) (One J.S.A. on Rs. 160 p.m.) Total. 4,060 (including allowances.) (The scheme has already been considered under Item No. XV page 35 of this agenda.)

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
	(*xiii*) p. 119-121. **General Recommendations.** The Board noted and endorsed the recommendation of its Committee.
	(*xiv*) p. 121. The Board noted and endorsed the recommendation of its Committee.
	(*xv*), (*xvi*), (*xvii*), (*xviii*) & (*xix*) p. 121. The Board endorsed the recommendations of its Committee.
	3 (*i*) p. 121. The Board noted.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	(*ii*) Study of Sulphur Analogues of Polycyclic Hydrocarbons and of Sterols for their Carcinogenic and Cancer Inhibiting Properties by Dr. V.R. Khanolkar. The scheme consists of two parts—(*a*) Synthesis of sulphur analogues of polycyclic hydrocarbons and of sterols ; and (*b*) their tests for carcinogenic and cancer inhibiting properties. It is also proposed to extend the work to naturally occurring sterols later. The chemical investigation will be carried out under Dr. B.D. Tilak at the Bombay University and the Biological work at the Indian Cancer Research Centre, Bombay. The scheme will take 3 years. Dr. Khanolkar had requested for a grant of Rs. 8,740 for the biological work and a grant of Rs. 10,295 for the chemical work. The Research Committee recommended that only the testing of sulphur analogues of polycyclic and their sterols for carcinogenic and cancer properties be taken up and the following grant was recommended :— Equipment ... Nil Contingencies ... Rs. 2,500 Staff ... Rs. 6,240 (including allowances). (One Jr. Research Asst. on Rs. 160 p.m. Two Jr. Lab. Asst. on Rs. 60 p.m. each). Total Rs. 8,740 (including allowances). The Committee also recommended that Dr. Khanolkar be requsested to undertake the testing of the compounds synthesised by other workers also.	(*ii*) p. 123. The Committee recommended that the Research Scheme on the Study of Sulphur Analogues of Polycyclic Hydrocarbons etc., by Dr. V. R. Khanolkar be approved and the following grant be sanctioned : Equipment ... Nil. Contingencies . Rs. 1,500 Staff ... Rs. 4,263 (including allowances) (One J.R.A. & One J.L.A.). Total Rs. 5,763 (including allowances) The Committee also recommended that Dr. Khanolkar be requested to follow the lines suggested by the Research Committee in the investigation.	(*ii*) p. 123. The Board endorsed the recommendations of its Committee.
	(*iii*) Availability of Calcium in Cases of Osteoporosis and Osteomalacia from Indian Foodstuffs by Dr. B.N. Sinha. The Committee did not recommend the scheme.	(*iii*) p. 123. The Committee did not recommend the scheme.	(*iii*) p. 123. The Board did not recommend the scheme.
	(*iv*) Therapeutic Effects of Iodine Compounds in Typhoid Cases by Dr. J.C. Banerjee. The Committee did not recommend the scheme for sanction. (The scheme has already been considered under item XVIII pages 39-41 of this agenda).	(*iv*) p. 123. The Committee noted that the scheme had already been considered under Item XVIII p. 39-41 of this agenda.	(*iv*) p. 123. The Board noted.
	(*v*) Cultivation and Commercial Development of Medicinal and Economic Plants of North Western Himalayan Region by Col. R.N. Chopra. The Committee noted that Col. Chopra had submitted this comprehensive scheme on the recommendation of the Committee at the last meeting and he had not sought renewal of his		

Item No.	Particulars.
	original scheme. The Committee recommended the scheme for sanction with the following grant :— Equipment ... Nil Contingencies ... Rs. 2,000 Staff ... Rs. 9,912 (including allowances). (One Sr. Researh Asst. (Botanist) on Rs. 500 p.m. One Sr. Research Asst. (Chemist) on Rs. 300 p.m. One Plant Collector on Rs. 75 p.m. One Stenotypist on Rs. 67 p.m.) Total Rs. 11,912 (including allowances). The Committee also recommended that Col. Chopra may prepare good description with diagrams of the part which was used medicinally in order to help the identification of real drugs in powder form as available in Indian markets. The pharmacognostical work may be taken up in the Central Drug Research Institute, Lucknow. (The scheme has already been considered under Item No. XIV pages 31-33 of this agenda). (*vi*) Haemostatic Action of Certain Plants by Dr. G.S. Pendse. The Committee did not recommend the scheme. (The scheme has already been considered under Item No. XVI page 37 of this agenda). (*vii*) New Paths to Chloramphenicol by Dr. A Tyabji. The Committee recommended the scheme with a contingent grant of Rs. 1,000 only. (The scheme has already been considered under Item No XIX pages 41-43 of this agenda). (*viii*) New Method for the Preparation of Isonicotinic Acid Hydrazide by Dr. D.K. Banerjee. The Committee did not recommend the scheme. (The scheme has already been considered under Item No. XVII page 39 of this agenda). (*ix*) Biosynthesis of Citrinin Analogues and Study of their Mechanism of Antibiotic Action by Dr. A Sreenivasan and Mr. D.V. Tamhane, Department of Chemical Technology, Bombay. The Committee deferred consideration of the scheme to the next meeting. (The scheme has already been considered under Item No. XX page 43-45 of this agenda).

ecommendations of the Committee of the Board.	Recommendations of the Board.
(*v*) p. 123-125. The Committee noted that the scheme had already en considered under Item XIV p. 31-33 of this enda.	(*v*) p. 123-125. The Board noted.
(*vi*) p. 125. The Committee noted that the scheme had already en considered under Item XVI p. 37 of this enda	(*vi*) p. 125. The Board noted.
(*vii*) p 125. The Committee noted that the scheme had already en considered under Item XIX p. 41-43 of this enda.	(*vii*) p. 125. The Board noted.
(*viii*) p. 125 The Committee noted that the scheme had already en considered under Item XVII p. 39 of this enda.	(*viii*) p. 125. The Board noted.
(*ix*) p. 125. The Committee noted that the scheme had already en considered under Item XX p. 43-45 of this enda.	(*ix*) p. 125. The Board noted.

PROCEEDINGS OF THE PHARMACEUTICALS AND DRUGS RESEARCH COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	4. CONSIDERATION OF THE PROCEEDINGS OF THE AD HOC COMMITTEE FOR INTEGRATION OF PHARMACOLOGICAL WORK IN INDIA. The Research Committee endorsed the following recommendations of its Sub-Committee on Integration of Pharmacological Work in India : (*i*) Production capacity of pharmaceuticals, galenicals, etc., in India was satisfactory both as regards quality and quantity. India had even surplus for export. Their import would, therefore, appear to be unnecessary. Production of antibiotics, sulfa drugs, antimalarials and other synthetic remedies was deficient. This deficiency should be made up as early as possible. It was therefore recommended : (*a*) Intensive efforts should be made to develop the production of antibiotics and other synthetic remedies. In this connection the Committee noted with satisfaction the steps taken by the Government of India towards the establishment of the Pencillin Factory; (*b*) The future efforts of drug research in India should be directed towards the discovery of newer antibiotics from indigenous sources; (*c*) A new chemotherapeutic approach should be made towards the treatment of diseases common in India such as malaria, tuberculosis, leprosy, cancer and gastrointestinal disturbances such as cholera, dysenteries etc; and (*d*) To achieve this objective, it was essential that coal tar intermediate and calcium carbide industries should be developed as early as possible. (*ii*) With regard to the report submitted on pharmacological research in the southern and western zones, the Sub-Committee was of the opinion that it would not be feasible for the C.S.I.R. to establish pharmacological centres in different parts of the country. The Central Drug Research Institute would carry out most of the advanced pharmacological work required by various workers receiving financial aid from the Council. The Sub-Committee was of the view that for preliminary pharmacological screening, the present Antibiotic Centre at the St. Xavier's College, Bombay may be strengthened by a grant for the purchase of necessary equipment, provided the college authorities made more space available for this purpose. (*iii*) Based on the suruey made it came to be known that adequate facilities for pharmacological research did not exist in many of the institutions. It was recommended that the Sub-Committee should take the responsibility of initiating research schemes in this field and circulate them among the premier research institutions and workers in India for consideration. (*iv*) The Sub-Committee recommended the establishment of an Indian Society of Pharmacology and Chemotherapy for encouraging pharmacological and biological work on both fundamental and applied aspects.	4. (*i*) p. 127. The Committee endorsed the recommendations of the Sub-Committee on Pharmacological work in India and further recommended that these may be communicated to the Ministries of Health, Commerce and Industry, the Central Drug Research Institute and the other organisations concerned. (*ii*) & (*iii*) p. 127. The Committee was of the opinion that facilities at the Central Drug Research Institute were adequate for the present needs of pharmacological research under the C.S.I.R. The Committee further recommended that the Research Committee be requested to formulate detailed proposals for the future development of pharmacological research in India taking into account the availability of facilities, personnel and the expected needs. (*iv*) p. 127. The Committee endorsed the recommendation of the Research Committee.	4. (*i*) p. 127. The Board endorsed the recommendations of its Committee. (*ii*) & (*iii*) p. 127 The Board noted the opinion of its Committee and endorsed its recommendation. (*iv*) p. 127. The Board endorsed the recommendation of the Research Committee.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	(v) In order to focus better attention on papers emanating from the various research institutions in the country in the fields of biological sciences, the Sub-Committee recommended that a separate volume of the Journal of Scientific & Industrial Research similar to Part B of the Proceedings of the Royal Society of London may be brought out.	(v) p. 129. The Committee noted that the question had been referred to the Editorial Board of the J.S.I.R. for detailed consideration.	(v) p. 129. The Board noted and agreed that the Editorial Board of the Journal of Scientific & Industrial Research had not agreed to the proposal for a separate Journal for Biological Sciences. The Board recommended that biological papers may however be published in a separate section.
	(vi) The Sub-Committee reconsidered, in terms of the directive of the Governing Body, the advisability of making a lump sum grant to the Antibiotic Research Centre for the development of an Animal Farm on the site of five acres at Khandala so kindly placed at its disposal by the authorities of the St. Xavier's College, Bombay, rent free for an unlimited period. The Sub-Committee recommended that a lump sum non-recurring grant of Rs. 5,000 be given to the Antibiotic Research Centre, to breed experimental animals for their own use and if possible, for other schemes under the Council in that region. Col. Bhatnagar should specify the details	(vi) p. 129. The Committee reiterated the following recommendation made in its meeting held on March 18, 1952: "The Committee noted that experimental animals were at present bred at the Haffkine Institute, Bombay, Institute of Science, Bangalore, Central Research Institute, Kasauli, Malaria Institute of India, Delhi, All India Institute of Hygiene, Calcutta, Central Drugs Laboratory, Calcutta. Veterinary Research Institute, Izzatnagar and B.C.G. Vaccine Laboratory, Guindy, Madras. One such centre had also been opened in the Central Drug Research Institute. In view of the fact that there were already a number of such centres, though not adequately developed, it was recommended that the Research Committee be requested to re-consider the subject in detail, especially the question of opening a new centre of a permanent nature under non-official auspices and then submit detailed proposals for the development of the existing centres and for the opening of new centres, if necessary". In the light of the above recommendation the Committee did not consider it necessary to start a new centre for rearing experimental animals. A lump sum non-recurring grant of Rs. 5,000 would be inadequate for the purpose. The Committee recommended that the centres which were already functioning should be developed. Col. Bhatnagar could obtain his requirements from the existing centres.	(vi) p. 129. The Board endorsed the recommendation of its Committee.
	5. Consideration of the Proceedings of the Malaria Chemotherapy Committee. (This has been dealt with separately under Item No. XXXIX pages 111-115 of this agenda)	5. p. 129. The Committee noted.	5. p. 129. The Board noted.
	6. NEXT MEETING. The Committee recommended that the annual meeting of the Research Committee may be held at Lucknow and the mid-year meeting at different centres where scientific investigations sponsored and financed by the C S I R. were being carried out. The Bombay members invited the committee to hold its next meeting at Bombay.	6. p. 129. The Committee noted.	6. p. 129. The Board noted.
	7. SYMPOSIUM. The Committee recommended that a symposium on "Antibacterial Substances from Soil Plants and Other Sources" be held in March 1953 to synchronise with the visit of Sir Alexander Fleming at Bombay. (This has already been considered under Item No. 3 page 91 of this genda).	7. p. 129. The Committee noted that the subject had already been considered under item 3 p. 91 of this agenda.	7. p. 129. The Board noted.
XLI	*Subject*: **Biochemical Research Committee** (*Chairman*: *Dr. M. Damodaran*) *Synopsis*: 1. A meeting of the Biochemical Research Committee was held on the 19th January 1953 at Mysore. 2. SCHEMES IN PROGRESS: (i) Determination of Processing Conditions for the Preservation of Indian Vegetables by Heat Treatment (Canning) by Dr. A. N. Bose, Calcutta. The Committee *recommended the scheme for renewal* for 1953-54 and *also recommended the following* points to be observed in continuation of the work:	XLI. **Biochemical Research Committee.** 1. p. 129. The Committee noted.	XLI. **Biochemical Research Committee.** 1. p. 129. The Board noted.

BIOCHEMICAL RESEARCH COMMITTEE

Item No.	Particulars.
	(*a*) time of 10 minutes uniformly used by the investigator for processing of vegetables was too short; it should be 30 to 40 minutes ; (*b*) work should be done only on such vegetables which could economically be canned; on which similar work has not already been carried out elsewhere and which are of special interest in India. Study of cauliflower and ladies fingers may be included while work on peas was unecessary ; (*c*) investigation of the causes of discoloration of vegetables in cans and staining of tin plates in contact with vegetables during processing may also be discontinued. There was sufficient information already available on this subject. Dr. Bose should also keep in touch with Dr. Girdhari Lal of the Central Food Technological Research Institute, Mysore for advice. (*ii*) Proteins from Green Leaves by Dr. B. C. Guha, Calcutta. The Committee approved the lines of work being pursued and suggested that work should be concentrated on one or two products and that the nutritive value of the protein concentrates obtained should be studied simultaneously with experiments on large scale production. *Renewal of the grant-in-aid for* 1953-54 *was recommended.* (*iii*) Cytogenetics of Yeasts & Fungi by Dr. M.K. Subramanian, Bangalore. The Committee considered that the work being done was of great fundamental value and had possible practical applications. *The renewal of the scheme for* 1953-54 *was recommended.* The Committee *also recommended* that the investigator should make efforts to explore the practical possibilities of the new strains of yeasts isolated by him. The collaboration of some alcohol distillery may be sought. Since Dr. M.K. Subramanian was working on a field of great importance to the future of fermentation industry and no other member of the Biochemical Research Committee was conversant with the genetics of micro-organisms, the *Committee recommended that Dr. Subramanian be invited to be present at the next meeting.* (*iv*) Thyroidal Activity of Thyroglobulin and Other Iodoproteins by Dr. P.S. Sarma, Madras. The Committee *recommended renewal of the scheme for* 1953-54 The physiological effects of feeding iodo-proteins should also be undertaken in addition to the work already planned. In view of the greater volume of work involved the Committee also recommended that an additional post of a Senior Scientific Assistant be provided.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
2 (*i*), (*ii*), (*iii*), & (*iv*) p. 129-131. The Committee recommended renewal of the following Research Schemes with the grants indicated against each for the year 1953-45. **(*i*) Processing conditions of vegetables etc., by Dr. A.N. Bose:** Equipment — Nil Contingencies — Rs. 1,000 Staff: (1. J.R.A.). — Rs. 3,278/1 (including allowances) Total — Rs. 4,278/1 (including allowances) **(*ii*) Proteins from green leaves by Dr. B.C. Guha:** Equipment — Nil Contingencies — Rs. 1,000 Staff: (1 S.R.A. and 1 Mechanic) — Rs. 6,347 (including allowances) Total — Rs. 7,347 (including allowances) **(*iii*) Cytogenetics of Yeasts & Fungi by Dr. M.K. Subramaniam:** Equipment — Nil Contingencies — Rs. 1,500 Staff: (3 J.R.A's and 1 S.L.A.). — Rs. 11,668 (including allowances) Total — Rs. 13,168 (including allowances) **(*iv*) Thyroidal Activity of Thyroglobulin etc. by Dr. P.S. Sarma** (with one additional S.R.A.) Equipment — Nil Contingencies — Rs. 1,000 Staff: (1 S.R.A., 1 J.R.A. and 1 J.L.A.) — Rs. 8,402 (including allowances) Total — Rs. 9,402 (including allowances) The Committee also endorsed the recommendations of the Research Committee with regard to the lines on which work was to be continued in the above schemes.	2 (*i*), (*ii*), (*iii*), & (*iv*) p. 129-131. The Board endorsed the recommendations of its Committee.

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*v*) Nutritive Value of Canned Food-stuffs by Dr. N.G. Magar, Bombay. It was pointed out that the method of sampling used by the investigator was defective as only one tin of canned product was used in each case for analysis, while ordinary analytical procedure required at least six tins to be used and an average value obtained. The Committee *recommended that such of the work which had yielded results of real value should be repeated,* before publication, with better sampling as suggested. Future work should be carried out in close collaboration with the Central Food Technological Research Institute. The Committee *recommended renewal of the scheme for* 1953-54 subject to the above conditions.	(*v*) p. 133 The Committee endorsed the recommendation of the Research Committee and also recommended sanction of the following renewal grant to Dr. N.G. Magar. Equipment Nil Contingencies Rs. 360 Staff: (1 J.R A.) Rs. 3,227 (including allowances) Total Rs. 3,587 (including allowances)	(*v*) p. 133. The Board endorsed the recommendations of its Committee.
	(*vi*) Development of a Process of Continuous Fermentations by Mr. M. Sreenivasaya, Bangalore. (*vii*) Microbiological Reduction of Sulphates by Mr. M. Sreenivasaya, Bangalore. Mr. Sreenivasaya informed the Committee that work on these two schemes could not be started during the year 1952-53 as the Indian Institute of Science did not provide him with the services of the usual laboratory helpers and that the Director, Indian Institute of Science had approached the C.S.I.R. for the sanction of additional staff.	(*vi*) & (*vii*) p. 133. The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally.	(*vi*) & (*vii*) p. 133. The Board endorsed the recommendation of its Committee.
3.	NEW SCHEMES: (*i*) Production of a New Variety of Food Yeast by Dr. N.R. Dhar, Allahabad. The Committee considered the report of the National Collection of Type Cultures on the morphological examination of 'Dhar Yeast' that the organism "was not strictly an yeast but an yeast like fungus belonging to the group '*Fungi imperfecti*' and probably belonging to the genus Mycoderma. It was extremely slow growing in comparison to real yeasts and on account of its morphological and cultural variability is unsuitable for cultivation for any specific purpose. In breweries and distilleries it is considered a pest". Mr N A. Parkes of the East India Distilleries and Sugar Factories Ltd., Nellikuppam had also reported that the yeast did not promise to lend itself to the process so far applied by us in the production of food yeast or baker's yeast. A study of the publications on which the claims of 'Dhar Yeast' were based also showed that the results obtained arose from the improper techniques used, such as harvesting the yeast after as many as 75-85 days. In view of the above, the Committee *did not recommend the scheme.*	3 (*i*) p. 133. The Committee did not recommend the Research Scheme for award of a grant	3. (*i*) p. 133. The Board did not recommend the Research Scheme for award of a grant.
	(*ii*) Studies on the Preservation of Fish by Dr. N.G. Magar, Bombay. The Committee *did not recommend the scheme* for financial assistance as no new lines of		

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	approach to the problem had been suggested and as work on these lines was already being undertaken at the Central Marine Fisheries Research Station, Mandapam. (The scheme has already been considered under Item No. XXIV pages 53-55 of this agenda).	3 (*ii*) p. 133-135. The Committee noted that the scheme had already been considered under Item XXIV p. 53-55.	3 (*ii*) p. 133-135. The Board noted.
	(*iii*) Studies in the Use of Antibiotics in the Storage of Food-grains by Dr. S.K. Bose, Calcutta. The Committee noted that the investigator had already isolated strains of bacteria which inhibited fungi responsible for food spoilage. The scheme as submitted was much too vague in conception since antibiotics were not likely to be used in any appreciable quantity for the preservation of food grains. The investigator may resubmit his scheme dealing only with a study of the antifungal antibiotics produced by bacteria isolated and identified by him, to be re-considered by the Committee.	(*iii*) p. 135. The Committee recommended that Dr. S.K. Bose be requested to submit a revised scheme as suggested by the Research Committee.	(*iii*) p. 135. The Board endorsed the recommendation of its Committee.
	(*iv*) Microbial Production of Vitamin B_2 and B_{12} by Dr. S.C. Roy, Lecturer in Biochemistry, Calcutta University. [The scheme consists of two parts : *Part I.* The large scale production of vitamin B_2 is based on the biosynthesis brought about by Clostridium acetobutylicum and Eremothecium ashbyii. The processes are covered by patents. Dr. Roy has carried out laboratory scale work on the production of riboflavin by the submerged aerobic culture of A. gossypii and obtained yields of 150-200/m.l. of fermenting locality. By improving the conditions of experiment an higher yield is expected. *Part II.* Streptomyces griseus and Streptomyces aurefaciens are generally used in commercial production of crystalline vitamin B_{12}. Another substance Bacillus subtilis has also the power of synthesising vitamin B_{12} in suitable fermenting medium. Dr. Roy has carried out laboratory scale experiments on the biosynthesis of vitamin B_{12} using B subtilis both by submerged type and shake flask culture technique and obtained yield of 0.11/m.l. It is proposed in the scheme : (*a*) to study the conditions for optimum yield by S. griseus and S. aureofacieus; (*b*) to study if preformed intermediaries, 5:6-dimethylbenziminazole, phosphorylated ribose (hydrolytic fragments of the main molecule of B_{12}) and other compounds such as purine and pyrimidine bases can increase the yield of B_{12} by the fermentative process; (*c*) to carry out purification, and concentration of B_{12} microbially produced; (*d*) to search for other organisms with higher synthetic capacity than S. griseus and S. aureofacieus. The work is expected to be completed in 2 to 3 years.]		

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	The Committee considered the scheme quite promising, although as submitted, too wide in scope, and *recommended that Dr. Roy may be asked to limit his work to the part dealing with the microbial production of vitamin B_{12}. The following grant was recommended* :— Equipment ... Nil Contingencies ... Rs. 1,500 Staff — Rs. 3,540 (including allowances). (One J.S.A. on Rs. 200 plus allowances). Total Rs. 5,040 (including allowances). (*v*) Studies on the Biochemical Role of Zinc by the Use of Radioactive Zinc by Dr. P.S. Sarma, Madras. The Committee considered the scheme to be of fundamental importance. It would be more appropriately dealt with by the Nutrition Advisory Committee of the Indian Council of Medical Research or the Atomic Energy Commission as it involved the use of radioactive isotopes. It was *recommended that the scheme may be referred to the Atomic Energy Commission.* (*vi*) Studies in the Nutrition of Fat by Dr. N.G. Magar, Bombay. The Committee *did not recommend the scheme* as it was not considered necessary to study the subject afresh in view of the large amount of work already done in India. (*vii*) Fat Production by Microbial Farming By Dr. H.N.De, Professor of Biochemistry, N.G.M. Medical College, Indore. [The object of this scheme is the development of technique of fat production by microbial farming with resources available in India. Microbial farming of food is more economical than agricultural farming as it is based on chemurgy making use of waste cellulosic materials. The programme of work will comprise (a) selection of the fermenting medium and the proper strains of fungus and yeast to yield maximum fat per unit consumption of sugar; and (b) chemical and bio-chemical studies of the microbial fats to assess their suitability for industrial and human consumption. The scheme is expected to take three years.] The Committee considered the scheme to be well planned and promising and a fundamental piece of work and *recommended it with the following grant* :— Equipment Nil. Contingencies ... Rs. 2,000 Staff ... Rs. 3,120 (including allowances) (One Research Asst. on Rs. 200 in the scale Rs. 160-10-300) Total Rs. 5,120 (including allowances)		

Recommendations of the Committee of the Board.	Recommendations of the Board.
(*iv*) p. 135-137. The Committee recommended that the Research Scheme by Dr. S.C. Roy be approved with the altered title 'Microbial Production of Vitamin B-12'; the following grant was also recommended. Equipment Nil Contingencies Rs. 1,000 Staff: (1 J.R.A.). Rs. 2,805 (including allowances) Total Rs. 3,805 (including allowances)	(*iv*) p. 135-137. The Board endorsed the recommendation of its Committee.
(*v*) p. 137. The Committee noted that departmental action had already been taken to refer the Research Scheme to the Atomic Energy Commission.	(*v*) p. 137. The Board noted.
(*vi*) p. 137. The Committee did not recommend the scheme for a grant.	(*vi*) p. 137. The Board did not recommend the scheme for a grant.

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	It was *also recommended* that the programme of work be restricted to the study of organisms to be used in fat production. The nutritive value of the fat obtained could be studied later when large amounts of fat had been produced. The Committee also wished to draw the attention of the investigator to a recent review of the subject by Hildebrand in Recent Advances in Enzymology, Vol. IX. (*viii*) Investigation on Parboiling of Rice by Dr. B.C. Guha and Dr. A.N. Bose, Calcutta. The Committee was informed of the work on similar lines undertaken at the C.F T.R I. Mysore which had reached an advanced stage. In view of this the Committee *did not recommend the scheme.* (*ix*) Nutritive Value of Palm Gur by Dr. Mrs. K. Sohonie, Bombay. The scheme was of topical interest. The Committee *recommended the scheme* with the following grant : Equipment ... Nil. Contingencies ... Rs. 500 Staff ... Rs. 3,540 (including allowances). (One Research Asst. on Rs. 200 in the scale Rs. 160-10-330) Total Rs. 4,040 (including allowances). (The scheme has already been considered under Item No. XXII pages 49-51 of this agenda). (*x*) Preparation of Proteins and Protein Concentrates from Non-edible Fish (Bombay Fish) by Dr. Mrs. K. Sohonie, Bombay. As work on this subject could be more appropriately undertaken at the Laboratories of the Fisheries Department of the Government of Bombay, the scheme *was not recommended for sanction.* (The scheme has been considered under item No. XXIII pages 51-53 of this agenda). 4. DR. N.N. DASTUR'S REVIEW ON UTILISATION OF MICRO-ORGANISMS FOR PRODUCING FOOD FOR LIVESTOCK FROM WASTE MATERIALS. The Committee thanked Dr. Dastur for preparing the review. The Committee felt that research should be undertaken to find cheap and economical sources of carbohydrates for food yeast production in India so that protein concentrates may be available for enriching the feed of livestock. The Committee considered it desirable to support suitable schemes on this subject.	(*vii*) p. 137-139. The Committee recommended that the Research Scheme on Microbial Fat Production by Dr. H.N. De be approved with the programme of work suggested by the Research Committee; the following grant was also recommended: Equipment Nil Contingencies Rs. 1,000 Staff: (1 J.R.A. on Rs. 200 p m.) Rs. 2,860 (including allowances) Total Rs. 3,860 (including allowances) (*viii*) p. 139. The Committee did not recommend the scheme for a grant (*ix*) p. 139 The Committee noted that the scheme had already been considered under Item XXIII p. 49-51 of the agenda. (*x*) p. 139. The Committee noted that the scheme had already been considered under Item XXIII p. 51-53 of this agenda. 4. p. 139. The Committee agreed with the opinion of the Research Committee and further considered that the Indian Council of Agricultural Research would also be interested in the subject. It was recommended that the Research Committee be requested to formulate detailed and specific proposals for undertaking research in the subject, in consultation with the appropriate Committee of the I.C.A.R for their consideration.	(*vii*) p. 137-139. The Board endorsed the recommendations of its Committee. (*viii*) p. 139. The Board did not recommend the scheme for a grant. (*ix*) p. 139. The Board noted. (*x*) p. 139. The Board noted. 4. p. 139. The Board endorsed the recommendation of its Committee.

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	5. REPORT ON "A SURVEY OF THE FERMENTATION INDUSTRIES AND THEIR RAW MRTERIALS IN INDIA."
	The Committee carefully considered the various points raised by the Chief Editor (Publications) C.S.I.R. and the comments on them by the Chairman, Biochemical Research Committee and was unanimously of the opinion that the Survey Report as prepared satisfied the Committee's references for the preparation of the report and contained all the information which the Committee was in a position to collect regarding (*i*) the position of raw materials for the fermentation industries in India and (*ii*) the scope for starting such industries in the country at present. Accounts of technological advances in the fermentation industries, the technical efficiency of existing alcohol distilleries in India and the preparation of detailed plans for improving them and for starting new fermentation plants should be considered as subject matter for future reports. The feasibility of the Committee undertaking such work and the additional staff that would be required for it needed careful consideration. The Committee *felt that there was no justification for delaying the publication of the present report* which had been carefully considered by the Committee in all its aspects. It was a collection of valuable data not otherwise accessible and which should be made available to industrialists and others interested before the statistical information contained in the report became out of date. The Committee also suggested that if the Chief Editor (Publications) had any additional data derived from authentic sources either on the raw material position of the fermentation industries or the immediate targets for fermentation products, he may be requested to make such data available to the Committee. For this purpose it *was recommended* that the Assistant Secretary be deputed to Delhi to have personal access to the facts and figures in the possession of the Publications Division, C.S.I.R.
	6. ANY OTHER BUSINESS :
	(*i*) The Chairman informed the Committee that in the matter of setting up an Isotopic Tracer Laboratory at the N.C.L. as recommended by the Committee at its last meeting, no proposals had been sent to the Atomic Energy Commission as it was considered possible to provide the necessary funds out of the budget of the N.C.L. itself, and that proposals to this effect had already been sent to the C.S.I.R.
	(*ii*) The Committee was informed that the National Collection of Type Cultures at the N.C.L. had compiled the manuscript of National Directory of Type Culture Collections in India, which was being sent to the Council for publication.

Recommendations of the Committee of the Board.	Recommendations of the Board.
5. p. 141. In view of the difference of opinion between the Chairman, Biochemical Research Committee and the Chief Editor, Publications, the Committee recommended that, (*i*) the factual data given in the Report be checked up; (*ii*) the report be referred to a Bio-Chemist who was not connected with the C.S.I.R for advice; and (*iii*) the Chief Editor and the Chairman of the Research Committee may discuss the final shape of the Report after ascertaining the views of the Adviser.	5. p. 141. The Board endorsed the recommendations af its Committee.
6. (*i*) p. 141. The Committee noted.	6. (*i*) p. 141. The Board noted.
(*ii*) p. 141. The Committee noted that the Directory of Type Culture Collections in India was under publication.	(*ii*) p. 141. The Board noted.

PROCEEDINGS OF THE ESSENTIAL OILS RESEARCH COMMITTEE

Item No.	Particulars.
XLII	*Subject*: **Proceedings of the Essential Oils Research Committee** (*Chairman: Mr. A.K. Menon*). *Synopsis*: 1. A meeting of the Essential Oils Research Committee was held on the 26th and 27th December, 1952 in New Delhi. 2. The Chairman referred to the slump in the export of essential oils from India. The price of Indian lemon grass oil had fallen to 1/6 of its previous value on account of inferior quality of Indian oil and competition from Haiti and Guatemala who supplied purer oil. The Government of Travancore-Cochin had recently set up a Lemon-grass Research Station near Alwaye to study the cultural and chemical problems of the industry with special reference to standardisation, quality control and marketing. Indian Standards Institution was also taking up the matter. The export of Indian Sandal-wood oil is also lagging not because of quality but because of the competition from the Amyris oil from Haiti. Trial cultivations of vetivert, linaloe, clove etc., were being carried on in different parts of Southern India with good results. Investigations on rose, patchouli and citrus oils were in progress. Important work was also being done at the Forest Research Institute. The Chairman suggested that development of synthetics and semi-synthetics which were also of potential value should be looked into. 3. PROGRAMME AT N.C.L., POONA : (*a*) The Committee noted the progress of work on essential oils in the National Chemical Laboratory. (*b*) The Essential Oils Committee had earlier recommended that the National Chemical Laboratory be selected as the chief centre for carrying out research on essential oils without prejudice to such work being conducted elsewhere in India. Dr. Krishna desired to know what problems had been allocated to N.C.L. There was considerable confusion on this point as some of the work being carried out at N.C L. could be done with greater advantage at other Institutions. He desired that a clear allocation of fields of work be suggested for different Laboratories, and each Laboratory should draw up a regular programe of work. *Ad hoc* enquiries should be treated separately and should not interfere with the normal programme of work. The Committee should confine itself to problems connected with the development of essential oils industry in India. The problem of finding out alternative uses for a particular essential oil should be left to be tackled by the other Research Committees and the industry. The Committee should also assess the work involved and if some staff was required in addition to that already available, the Committee may make suitable recommendations. Dr. Krishna also desired the Committee to review its work done so far.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
XLII. Essential Oils Research Committee. 1 & 2 p. 143. The Committee noted.	**XLII. Essential Oils Research Committee.** 1 & 2. p. 143. The Board noted.

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	(c) The Committee agreed with the views of Dr. Krishna and felt that there was considerable scope for co-ordination between the Forest Research Institute and the National Chemical Laboratory and recommended that the Forest Research Institute should primarily concentrate on natural essential oils while the National Chemical Laboratory should chiefly devote itself to synthetics and semi-synthetics. It was also recommended that the two Institutes be requested to send their programmes of work on essential oils for the next year immediately and also to draw up a programme for the next five years, which may be circulated to the members of the Committee. (d) The Committee further recommended that work on the following problems may be suggested to other institutes in India for which they were best suited:- (i) Investigations on essential oil bearing -grasses of the Cymbopogon species—The Central Research Laboratory, Trivandrum and Alwaye. (ii) Essential oils from peels, leaves and flowers of citrus species—The Laxminarayan Institute of Technology, Nagpur. (iii) Investigation on development of rose oil industry—The Harcourt Butler Technological Institute, Kanpur; the work to be co-ordinated with C.S.I.R. scheme on roses. (iv) Investigations on Sassafras and Orris—The Central Drug Research Laboratory, Jammu. (v) Development of Patchouli and Cananga—The Indian Institute of Science, Bangalore in collaboration with Mr. Nirody.		
4.	SCHEMES IN PROGRESS. (i) Rose Investigation by Dr. K. Biswas, Calcutta. The Committee noted that the survey report on the rose growing areas of U.P. had been circulated to the members. The Committee appreciated the work done and requested the investigator to re-write the report from the point of view of its publication as a monograph. A Sub-Committee consisting of Mr. Goldstein and Mr. Nirody was constituted to go through the report before publication. The Committee recommended that Bangalore, Kollegal, Madras and South Madras in Southern India be also surveyed. For this purpose the scheme may be extended upto 31st May, 1953. The Committee was of the opinion that the future work should be directed towards the developmental aspects of rose industry and the investigator was requested to submit a fresh scheme for the purpose. (ii) Cultural Experiments on Patchouli by Mr. B.S. Nirody, Bangalore. Mr. Nirody explained that the yields obtained were lower than reported elsewhere because the plants were yet young and both twings and leaves had been distilled together. The Committee	3. p. 143-145. The Committee agreed with the opinion of the Essential Oils Research Committee that research problems on essential oils should be so allotted that laboratories best suited to handle specific problems were entrusted with such problems. The Committee recommended that the Forest Research Institute and the National Chemical Laboratory be requested to concentrate on naturally occurring essential oils and synthetics and semi-synthetics respectively. 4 (i) p. 145. The Committee recommended continuance of the Scheme on Rose upto end of May 1953 and sanction of the following grant: Equipment — Nil Contingencies — Rs. 500 Staff: (1 S.R.A. and 1 Fieldman) — Rs. 1,536 (including allowances) Total — Rs. 2,036 (including allowances) The Committee also recommended that Dr. K. Biswas be requested to rewrite the Survey Report on the Rose Industry with a view to its publication and that Mr. Goldstein and Mr. Nirody be requested to go through it before publication. The Committee further recommended that Dr. Biswas be requested to submit a new scheme to deal with the developmental aspects of the Industry in collaboration with Harcourt Butler Institute at Kanpur.	3. p 143-145. The Board agreed with the opinion of the Essential Oils Research Committee and endorsed the recommendation of the Committee of the Board. 4. (i) p. 145. The Board endorsed the recommendations of its Committee.

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	requested Mr. Nirody to collect complete data regarding composition of soil, climate, yields from different parts during its different stages of development etc. Dr. Krishna suggested that enzymic fermentation of leaves before distillation should also be tried. The Committee recommended that the Director, Indian Institute of Science be formally requested to investigate the chemical aspects of the problem in collaboration with Mr. Nirody. The Committee further recommended that small samples of the oil be sent to the following firms for opinion :— (*a*) Calcutta Chemical Co., Ltd., Calcutta. (*b*) Bengal Chemical & Pharmaceutical Works Ltd. Calcutta. (*c*) Godrej Ltd., Bombay. (*d*) Lever Brothers (India) Ltd., Bombay. (*e*) Tata Oil Mills Co., Ltd., Bombay. The Committee noted that arrangements had been made for importing 100 rooted cuttings of *Pogostemon cablin* from Nossi-Be for propagation in India. The Committee recommended that efforts be made to import seedlings of Cananga odorata (Ylang-ylang), from the available sources, such as Philippine Islands, Reunion and Madagascar. Mr. Nirody reported that these trees were met with in several parts of India. He also promised to submit a scheme for cultivating these trees in and around Bangalore.
(*iv*) Survey of Citrus Species by Dr. Girdhari Lal, Mysore.	(*a*) The Committee examined the samples of citrus oil submitted by Dr. Girdhari Lal but was not satisfied with the processes of distillation employed The samples were of very poor quality. Mr. Goldstein was of the opinion that we should concentrate on bitter orange trees as a source of essential oil, Pettitgrain oil from the leaves and Neroli oil from the flowers. The Committee recommended that the scheme be suspended for the present and Dr. Bhattacharya of N.C.L. be requested to write a review of the work carried out so far on citrus species in various institutions of India. (*b*) Mr. Goldstein reported that the Mildura Farm in Montgomery (Pakistan) was successfully marketing about a 1000 lbs. of citrus oil a year produced by hand expression and simple mechanical processes Dr. Krishna was of the opinion that efforts be made to make similar processes available to squash manufacturers in India who would thus be utilising their peel waste. The Committee recommended the appointment of a Chemist who after a period of initial training for three months under the guidance of Mr. Goldstein will visit factories and estates,

Recommendations of the Committee of the Board.	Recommendations of the Board.
(*ii*) p. 145-147. The Committee endorsed the recommendations of the Research Committee and also recommended the following grant for the scheme on Patchouli for the year 1953-54. Equipment Rs. 480 Contingencies Rs. 670 Staff 1 J R.A. 1 Fieldman 2 Malis Rs. 5,960 (including allowances) Total Rs. 7,110 (including allowances)	(*ii*) p. 145-147. The Board endorsed the recommendations of its Committee.
(*iii*) (*a*) p. 147. The Committee endorsed the recommendation of the Research Committee.	(*iii*) (*a*) p. 147. The Board endorsed the recommendation of the Research Committee.

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	demonstrating the process. During the latter part of the scheme, the Chemist will be working under the guidance of the Chairman, and will submit a report for consideration of the Committee at its next meeting.		
	(c) Dr. Krishna suggested that recent methods developed at N.C.L. for aqueous extraction of oil from oilseeds and release of starch from tubers may be examined with reference to extraction of essential oils.	(iii) (b) p. 147-149. The Committee endorsed the proposal to train up a chemist in citrus oil production and further recommended that the D.S.I.R. be authorised to take necessary action to select a suitable candidate in consultation with the Chairman of the Research Committee and Mr. Goldstein. After the training, the Chemist would visit citrus farms and factories in the country to demonstrate the processes.	(iii) (b) p. 147-149. The Board endorsed the recommendations of its Committee.
	(v) Monograph on Aromatic Plants of India :		
	The Chairman reported that while it was orginally planned to complete the survey in 24 parts and publish it as a monograph, only 15 parts had so far been completed and published as supplements to the J.S.I.R. Dr. Sadgopal had been requested to write an introductory chapter for the monograph which too was awaited. Dr. Krishna, senior author in this work stated that he had started this work in 1947 with the assistance of Dr. Sitarama Rao who soon left the Forest Research Institute. He requested the association of Mr. Badhwar who had then just joined the Institute. Fourteen parts were published by 1950 when he left for U.K. as Scientific Liaison Officer. No progress seemed to have been made during his absence. The fifteenth part had appeared only in December, 1952.	(iii) (c) p. 149. The Committee endorsed the suggestion.	(iii) (c) p. 149. The Board endorsed the suggestion.
	Dr. Sadgopal explained the extra hard work which Mr. Badhwar had to put in for completing this survey and pointed out that precedents existed for rewarding authors for bringing out such useful publications.		
	The Committee recommended the award of a suitable lumpsum honorarium commensurate with the effort to the junior authors at the completion of the present series of supplements. The Committee further recommended that Mr. Badhwar and Dr. Sadgopal be requested to complete the work within 18 months.	(iv) p. 149. The Committee endorsed the recommendation of the Research Committee and further recommended that the D.S.I.R. be authorised to take necessary action departmentally in consultation with the Chairman of the Research Committee and Dr. S. Krishna.	(iv) p. 149. The Board endorsed the recommendation of its Committee.
5.	DEVELOPMENT OF ESSENTIAL OIL INDUSTRY IN THE STATES :		
	(i) Khus industry in the Punjab, Malabar and Travancore-Cochin.		
	The Committee noted that the Punjab Government were getting examined the oil content of khus growing in the Punjab. The Committee was also glad to note the good progress of khus industry in Malabar and Travancore-Cochin.	5. (i) p. 149. The Committee noted.	5 (i) p. 149. The Board noted.
	(ii) Chua oil.		
	Dr. Sadgopal reported that the sal resin supplied by the Orissa Government contained very little essential oil, about 0.001%. On destructive distillation it gave a crude tarry product with a yield of about 4%. Dr. Krishna suggested that sal resin could perhaps serve as a raw material for semi-synthetic aromatic products and this problem may be referred to N.C.L.	5 (ii) p. 149. The Committee recommended that the problem of deriving semisynthetic aromatics from sal resin be referred to the N.C.L.	5 (ii) p. 149. The Board endorsed the recommendation of its Committee.

m No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	(*iii*) Cultivation of Germanium Plants and Camphor Trees in Madras. The Committee noted that the Government of Madras were taking keen interest in extending the geranium cultivation in the State by supplying cuttings to different estates and institutions. The Committee also noted that they had only 100 camphor trees (*Cinnamonum camphora*). The Committee recommended that the Chairman may pursue the matter further. (*iv*) Clove Oil : The Committee was glad to note that Mr. C.H. Simpson of Blackrock Estate Nagercoil, South Travancore had a plantation of clove trees, oil from which had been examined by Mr. Goldstein and found superior to imported oils. The Committee further noted that the information was being published in the J.S.I.R. and recommended that it may be brought to the notice of all interested. (*v*) Linaloe Oil : The Committee noted that linaloe oil produced from (*Bursera delpechiana* Poiss *ex.* Engl) at Tataguny estate near Bangalore was finding a good sale and the cultivation of the particular variety needed further extension, but the proprietor of the estate was not co-operating and had refused to supply seedlings. The Committee recommended that further efforts be made to obtain seedlings from him and at the same time efforts to obtain the seeds from Mexico be continued.	(*iii*) (*iv*) & (*v*) p. 151. The Committee endorsed the recommendations of the Research Committee.	(*iii*) (*iv*) & (*v*) p. 151. The Board endorsed the recommendations of the Research Committee.
	(*vi*) Dr. Sadgopal showed samples of essential oil obtained from the roots of *Homalomena rubescence* Kunth growing in abundance in Cachar and Karimganj in Assam. The yield of the oil was 4.6 to 6% on dry basis. The physico-chemical properties and composition of the oil had been studied at the Forest Research Institute. The oil contains 40% linalol, besides terpineol, esters, aldehydes etc. (*vii*) Cultivation of Lemongrass Oil : The Committee noted with satisfaction the steps taken by the Travancore-Cochin Government in setting up a Lemon-grass Research Station near Alwaye to investigate problems connected with the standardisation of oil, quality control, marketing etc. Dr. Krishna was not in favour of undertaking the work on the synthesis of vitamin A from lemongrass oil under the auspices of this Committee. The Chairman was writing a pamphlet on the Lemongrass oil industry.	(*vi*) & (*vii*) p. 151. The Committee noted.	(*vi*) & (*vii*) p. 151. The Board noted.
	6. TERMINATED SCHEMES : (*a*) Preparation of Vanillin and Preparation of Alpha and Beta Ionones by Messrs. Hindusthan Fine Chemicals Co., Bangalore. The Chairman reported that though Mr. Varadhan had left M/s. Hindusthan Fine		

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	Chemicals Co., he had completed the work on the two schemes. He had promised to submit reports by the middle of March, 1953. They will be circulated to the members when received. Dr. Krishna reported that a synthetic compound methyl guaicol had an odour six times stronger than vanillin and was being offered by M/s. Monsanto Chemicals in the market. (*b*) Bellary Leaf Oil: The Committee noted the remarks of the Director, N.C.L. on the report on bellary leaf oil: Dr. Sadgopal suggested that samples of various products obtained under these schemes be kept in the C.S.I.R. Secretariat so that in future any worker may obtain them if he so desired. The Committee agreed with the views of Dr. Sadgopal.	6 (*a*) p. 151-153. The Committee noted. (*b*) p. 153. The Committee endorsed the recommendation of the Research Committee.	6 (*a*) p. 151-153. The Board noted. (*b*) p. 153. The Board endorsed the recommendation of the Research Committee.
	7. SOLVENT EXTRACTION OF JASMINE BY M/S. TATA OIL MILLS CO., BOMBAY. The Chairman reported that M/s. Tata Oil Mills, Bombay, had financed a trial cultivation of jasmine at the N.C.L. colony on which solvent extraction experiments will be taken up next year. The work on the chemical and botanical aspects of jasmine completed so far under the C.S.I.R. scheme was being published as a monograph. Dr. Krishna suggested that the common garden flower *Franscisia floribunda* which smells very much like jasmine may also be examined. Dr. Sadgopal agreed to follow it up; Mr. Nirody suggested work on *Brunfelcia americana* which flowers profusely in all climates from Delhi to Cape Comorin.	7. p. 153. The Committee noted.	7 p. 153. The Board noted.
	8. WORK AT THE FOREST RESEARCH INSTITUTE, DEHRA DUN. (*i*) Camphor Bearing Ocimum Species: Dr. Sadgopal informed that Forest Research Institute had planted 16 acres of land near Rishikesh with *Ocimum kilimandscharicum*. The first harvest from about a couple of acres yielded about 100 lbs. of camphor of a much superior quality (98.5-99.5% purity) as compared with the market samples and had been disposed of at Rs. 4/8/- per lb. approximately. The *Ocimum* oil obtained besides the camphor had been kept back for experimental purposes. On an average, a yield of about 100 lbs. of total distillate per acre per annum could be expected on the basis of three cuts per year. (*ii*) Mentha Piperita: Dr. Sadgopal reported that the plants of *Mentha piperita* at the Forest Research Institute were still under experimental cultivation and examination. The oil examined so far yielded very little separable menthol. (*iii*) Pinus Longifolia Roxb: Dr. Sadgopal reported that oil from the fresh green needles of *Pinus longifolia* (Chir) had been distilled and examined. The yield was 0.14% on dry basis. Further work was in progress.		

Item No.	Particulars.
	On their suggestion the Assam Government had become seriously interested in the utilisation of *Pinus khasya* and had ordered distillation equipment from the United States. Dr. Bhattacharya informed that samples received from Assam Government supposed to be oil from *Pinus khasya*, on examination were found to be no different from oil of *Pinus longifolia*. The Committee recommended that the problem of making borneol acetate from turpentine may be referred to the N.C.L. (*iv*) Chenapodium Ambrosioides Linn: Dr. Sadgopal reported that cultural experiments for the scientific development of this important essential oil were in progrss. It was observed that ascaridol content of the distilled oil and its physico-chemical properties were abnormally poor due to decomposition of ascaridol during the distillation. After studying the various factors pilot scale distillations have been conducted successfully and conditions of distillation and quality of the raw material have been standardised so as to give a high quality oil with an ascaridol content of 76% in an economic yield of about 1.8% on dry basis. (*v*) Dr. Sadgopal reported that work was also in progress on costus root oil from *Sassurea lappa* C.B. Clarke, agarwood oil from *Aquilaria agallocha* Roxb, khus oil from roots of *Vetiveria zizanioides* (Linn) Nash, panjiri leaf oil from *Anisoehilus carnosus* Wall, etc. They had developed an oil trap which gave a high yield (1.8%) of oil from vetivert roots and he promised to supply the particulars. At Dr. Krishna's suggestion, Dr. Sadgopal informed that an economic recovery of Himalayan cedarwood oil from *Cedrus deodara* woodwaste had been perfected at the Forest Research Institute and the essential oil had also been examined for its chemical composition. The Essential oil could be made available to the industry at a reasonable price in case of a demand. 9. EXPORT OF OIL BEARING SEEDS : The Committee noted that D.S.I.R. had taken departmental action to recommend to the Government that there should not be an indiscriminate export of essential oil plant seeds from India. It should be done through an authorised central agency. 10. CULTIVATION OF OIL PALM : The Committee noted that the Indian Central Oilseeds Committee had taken up the question of intensive cultivation of oil palm. 11. ANY OTHER BUSINESS : (*i*) Import of Essential Oils : The Committee noted the request from M/s. Techno Chemical Industries Ltd., Kozhikode that oil of ginger and oleo-resin ginger should not be imported into India, because there was sufficient indigenous production.

Recommendations of the Committee of the Board.	Recommendations of the Board.
8. p. 153-155. The Committee noted with satisfaction the progress of work on essential oils in the Forest Research Institute. The Committee recommended that the problem of making borneol acetate from turpentine be referred to the N.C.L.	8. p. 153-155. The Board noted and endorsed the recommendation of its Committee.
9 p. 155. The Committee noted that the Ministry of Commerce and Industry had requested the C.S.I.R. for specific recommendations and that the Chairman of the Research Committee was taking necessary action.	9. p. 155. The Board noted.
10. p 155. The Committee noted.	10. p. 155. The Board noted.

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	The Committee recommended that the firm be requested to furnish information regarding the quantity of ginger oleo-resin and ginger oil which they produced, their analysis, cost of production and how much of these were being imported into India, etc. Import statistics may be collected by the firm directly from the consumers. It was also recommended that particulars of individual oils imported or exported should be classed as such and not included in "other sorts". (*ii*) Review of the Work of the Committee : The Committee decided to review its work during the past twelve years of its existence. The Chairman may be provided with a temporary Technical Assistant for this purpose. This report, the Committee considered will be a good supplement to the Essential Oil Advisory Committee's report. (*iii*) Symposium on "Research and Development in Indian Essential Oils and Aromatic Chemicals." The Committee recommended that a symposium on the above subject be held in September-October, 1953. (This has already been considered under Item No. 4 on page 91 of this agenda).
XLIII	*Subject* : **Proceedings of the Vegetable Oils Research Committee.** (*Chairman: Prof. T.R.Seshadri*) *Synopsis* : 1. A meeting of the Vegetable Oils Research Committee was held on the 9th December, 1952 at Poona. 2. SECONDARY OIL SEEDS : (*i*) Members were in favour of collection of the secondary oil bearing seeds, but it was realised that the forest resources of these oil bearing seeds were indefinite and limited. Propaganda should be carried out emphasizing the importance of the collection and encouraging the existing organisations. Local agencies carrying out the work of the collection of forest products should be properly informed regarding the use of the oil bearing seeds. Forest and agriculture departments of the State Governments could also help. Dr. S Krishna informed that the Forest Research Institute, Dehra Dun had already collected a great deal of data regarding these oil bearing seeds and suggested that the President, F.R.I., Dehra Dun could be approached in this connection. The Head of the Chemistry Division, F.R.I., could be invited for discussions. The data could be published and made available to the local agencies carrying out the work of collection of the forest products.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
11 (*i*) p. 155-157. The Committee endorsed the recommendations of Research Committee.	11 (*i*) p. 155-157. The Board endorsed the recommendations of the Research Committee.
11 (*ii*) p. 157. The Committee recommended that a temporary chnical Assistant be appointed for a period of three nths to assist the Chairman of the Research, Committee to prepare a review of the work of the Essential ls Research Committee.	11 (*ii*) p. 157. The Board endorsed the recommendation of its Committee.
(*iii*) p. 157. The Committee noted that the subject had already en considered under item 4 p. 91 of this agenda.	(*iii*) p. 157. The Board noted.
XLIII. **Vegetable Oils Research Committee.** 1. p. 157. The Committee noted.	XLIII. **Vegetable Oils Research Committee.** 1. p. 157. The Board noted.
2 (*i*) p. 157. The Committee endorsed the recommendations of the Research Committee.	2 (*i*) p. 157. The Board endorsed the recommendations of the Research Committee.

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	(*ii*) Brochure on Secondary Sources of Vegetable Oils. The Chairman informed that the Indian Central Oilseeds Committee was taking necessary action. It had already published a brochure on minor oil bearing plants and seeds in the Madras State. The members desired that a copy of their publications be sent to members of the Vegetable Oils Research Committee.	2 (*ii*) p. 159. The Committee recommended that the Indian Central Oilseeds Committee be requested to send a copy of their publications to each of the members of the Research Committee.	2 (*ii*) p. 159. The Board endorsed the recommendation of its Committee.
	3. NEW RESEARCH SCHEMES : (*i*) Stability and Component Fatty Acids in Hydrogenated Fats by Dr. N.G. Magar, Institute of Science, Bombay. The Committee felt that the Chairman may formulate a comprehensive scheme after carefully considering the question of duplication of work already done elsewhere and the suggestions made and the scheme may then be allotted to Dr. N.G. Magar or to any other suitable research centre where facilities exist.	3 (*i*), (*ii*), & (*iii*) p. 159. The Committee noted.	3 (*i*), (*ii*), & (*iii*) p. 159. The Board noted.
	(*ii*) Inter-esterification of Oils and Fats of Indian Origin by Prof. K.N. Menon. As Prof. K.N. Menon had not replied to the enquiries made, the consideration of the scheme was dropped.		
	(*iii*) Studying the Possibility of Commercial Production of Hydrogenated Fats of I.V. about 35-45 and m. p. about 40-41°C for Alimentary Purposes by Dr. A.R.S. Kartha. As expert opinion regarding the biochemical aspects of the scheme were not favourable, and as the author had shifted from Eranakulam to Pusa Institute, Delhi, the consideration of the scheme was dropped.		
	(*iv*) Chemical Investigation of Unsaponifiable Matter in Indian Edible Oils with Special Reference to their Steroid Portion by Dr. A. Tyabji, Bombay. The Committee felt that the scheme was chiefly of academic interest and the author had no previous experience of this line of work. The Committee did not recommend the scheme for sanction.	(*iv*) p. 159. The Committee did not recommend the scheme for a grant.	(*iv*) p. 159. The Board did not recommend the scheme for a grant.
	4. SCHEME IN PROGRESS : (*i*) Modification of the Mowrah Fat by Dr. J.G. Kane, Bombay. After hearing from Dr. J.G. Kane the progress made so far, the Committee recommended the scheme for continuance for another year. It was suggested that hydrogenation and subsequent crystallisation should also be included in the scheme.	4. p. 159. The Committee recommended the continuance of the Research Scheme on Modification of Mowrah Fat with the following grant for the year 1953-54:— Equipment — Nil Contingencies — Rs 1,000 Staff (1 J.R.A.) — Rs. 3,180 (including allowances) Total — Rs. 4,180 (including allowances)	4. p. 159. The Board endorsed the recommendation of its Committee.
	5. (*a*) Note on the Economics of Annona squamosa (Linn.) seed production in Hyderabad from the Director, Central Laboratories for Scientific and Industrial Research, Hyderabad (Dn), was noted with interest.	5 (*a*) p. 159. The Committee noted.	5 (*a*) p. 159. The Board noted.

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	(*b*) Letter from the Conservator of Forests, Jammu, regarding cultivation of sunflower seeds in Jammu and Kashmir State : It was recommended that the production of sunflower seed oil should be encouraged. (*c*) The Chairman placed on the table the minutes of meeting of the Technological Sub-Committee of the Indian Central Oilseeds Committee held on the 3rd of October, 1952 at New Delhi for information. 7. REFINING AND DEODOURISING OF NEEM OIL : A brief review of the work so far done under the C.S.I.R. was given by Dr. J.S. Aggarwal. It was noted that the Planning Commission had given the question of the collection of neem seeds due consideration.	(*b*) p. 161. The Committee endorsed the recommendation of the Research Committee. (*c*) p. 161. The Committee noted. 7. p 161. The Committee noted.	(*b*) p. 161. The Board endorsed the recommendation of the Research Committee. (*c*) p. 161. The Board noted. 7. p. 161. The Board noted.
XLIV	*Subject* : **Proceedings of the Fuel Research Committee.** (*Chairman : Dr. J.W. Whitaker*). *Synopsis* : 1. A meeting of the Fuel Research Committee was held on the 18th November 1952 at Jealgora. 2. MATTERS ARISING OUT OF THE PROCEEDINGS OF THE LAST MEETING : (*a*) The Committee noted that its suggestion for the levy of cess of one anna per ton of coal to finance the pilot plant experiments at the Fuel Research Institute had not been implemented by the Government. The Coal Board when approached for funds stated that, as no extra cess on coal had been sanctioned by the Government, funds were not available. At the suggestion of the D.S.I.R. the Committee *recommended* that the C.S.I.R. may draw the attention of the Government to the non-availability of funds for certain pilot plant experiments at the Fuel Research Institute and recommend to the Government *to immediately impose the proposed cess and to direct the Coal Board to give necessary assistance to the F.R.I.* (*b*) The Committee was informed that the Council had sanctioned Rs. 7.5 lakhs for immediate requirement of pilot plant work. The D.S.I.R. desired that the question of manufacture of pilot plants in India should be taken into consideration while placing the orders. Dr. Whitaker stated that whenever a tender was called from foreign firms, it was stipulated that as far as possible material that could be obtained or fabricated in India should be so done. Much of the work so far had been done in the F.R.I. workshops. Only specialised equipment were imported. On an enquiry from Dr. Whitakar, whether the provision of Rs. 41.25 lakhs made by the Planning Commission for pilot plant work could be anticipated for expenditure, the D.S.I.R. replied that the funds provided by the Planning Commission would be sanctioned by the Finance Ministry. Full statement of advance requirements should be placed before the Council when the plans were ready.	LXIV. **Fuel Research Committee.** 1. p. 161. The Committee noted. 2 (*a*) p. 161. The Committee noted with satisfaction that the Coal Board had agreed to make available a sum of Rs. 5 lakhs for pilot plant work at the Fuel Research Institute for the year 1953-54. 2 (*b*) p. 161. The Committee noted with satisfaction that the Planning Commission had set apart Rs. 7.5 lakhs for the immediate requirements of the Fuel Research Institute for pilot plant work. The Committee recommended that as far as possible the pilot plants should be fabricated in India itself and only those parts which cannot be made in India should be imported.	LXIV. **Fuel Research Committee.** 1. p. 161. The Board noted. 2 (*a*) p. 161. The Board recommended that the Coal Board be thanked for the contribution. 2 (*b*) p. 161. The Baord noted and endorsed the recommendation of its Committee.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	3. PROGRESS REPORT OF THE F.R.I. The Committee expressed its appreciation of the work done at the Institute.	3 p. 163. The Committee noted.	3. p. 163. The Board noted.
	4. REPORT OF THE COMMITTEE TO ADVISE ON THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE C.B. & C.R. SUB-COMMITTEE. (The details of the discussion are reported under Item No. 3 page 83 of this agenda).	4 p 163. The Committee noted that the subject had already been discussed under item 3 p. 83 of this agenda.	4. p. 163 The Board noted.
	5. PROGRESS OF WORK IN THE SCHEMES : (*i*) Coal Blending & Coking Research Sub-Committee, Jamshedpur. The Committee recommended the renewal of the scheme for the year 1953-54 at the end of which an assessment of the results would be made to decide further continuance. The Committee also approved of the programme of work for 1953-54 and recommended that the study of (*a*) the influence of different factors such as rate of heating, width of the oven, size of coal etc., on the quality of coke, and (*b*) standardisation of testing procedures of coke and the relevant testing equipment and correlation of the testing procedures practised in India, be kept in abeyance for the present.	5. (*i*) p 163. The Committee noted that the work of the Coal Blending and Coking Research Sub-Committee would be discussed in detail under item XLV p. 165-169 of this agenda.	5. (*i*) p. 163. The Board noted.
	(*ii*) Palaeobotanical Investigations of Indian Coals—Birbal Sahni Institute of Palaeobotany, Lucknow. On account of academic and practical interests of the work, the Committee recommended the scheme for renewal during 1953-54. (*iii*) Pilot Plant Investigations on Briquetting of Non-coking Coals—B.S.I.R., Hyderabad. Since it was necssary to carry out briquetting experiments on the Southern coals particularly of Singareni area and Madras lignite and as it would be expensive to bring large samples from the South to the Fuel Research Institute for testing, the Committee recommended that the scheme be renewed for the year 1953-54. (*iv*) Mechanism of Explosions—Dr. N.R. Tawde, Bombay. The Committee empowered the Chairman to recommend the renewal application when received. The Committee noted the progress of work.	5 (*ii*), (*iii*) & (*iv*) p. 163. The Committee recommended renewal of the following research schemes with the grants noted against each for the year 1953-54. (*ii*) Palaeobotanical Investigations of Indian Coals. Equipment — Rs. 1,800 Contingencies — Rs. 1,500 Staff: (1 S.R.A. 1 J.R.A. 1 Mechanic) — Rs. 9,400 (including allowances) Rs. 12,700 (including allowances) (*iii*) Briquetting of Non-coking Coals. Equipment — Nil Contingencies — Rs. 2,000 Staff: (1 J.R.A. 1 Mechanic) — Rs 5,040 (including allowances) Rs. 7,040 (including allowances) (*iv*) Mechanism of Explosions by Dr. Tawde. Equipment — Nil Contingencies — Rs. 1,000 Staff: (1 S.R.A. 1 J.R.A.) — Rs. 7,826 (including allowances) Rs. 8,826 (including allowances)	5 (*ii*), (*iii*) & (*iv*) p. 163. The Board endorsed the recommendations of its Committee.
	6. NEW SCHEMES: (*i*) Systematic Survey of the Coalfields of Hyderabad State by the Director, Central Laboratories for Scientific & Industrial Research, Hyderabad. (The recommendation of the Research Committee on the scheme are given in detail under Item No. XXVIII pages 61-63 of this agenda).	6 (*i*) p. 163. The Committee noted that the scheme had already been considered under item XXVIII p. 61-66 of this agenda.	6 (*i*) p. 163. The Board noted.
	(*ii*) Correlating Reactivity of Indian Cokes with their Performance in Industry by Dr. S. Banerjee, Department of Applied Chemistry, Calcutta University. The Committee considered that there was little chance of correlating the reactivities of		

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	coke with the performance in Industry unless such work was carried out in a large industrial establishment using coke for various purposes. Dr. Banerjee would have no chance of access to the day to day industrial performances. The Chairman was requested to obtain further clarification from Dr. Banerjee to find out what exactly he proposed to do.	(*ii*) p. 163-165. The Committee noted that the Chairman of the Research Committee was taking necessary action.	(*ii*) p. 163-165. The Board noted.
	(*iii*) Synthetic Petrol by Fischer-Tropsch Process by Dr. G.C. Basak and Mr. N.C. Niyogi, Howrah. The Committee considered that the scheme would be better done at the F.R.I. and the Bengal Engineering College had neither suitable personnel nor equipment. A pilot plant had also been ordered by the Indian Institute of Technology. The scheme was chemical engineering in nature and considerable finance was required for a systematic study of the process. The Committee did not recommend the scheme.	(*iii*) p. 165. The Committee agreed with the opinion of the Research Committee and did not recommend the scheme for a grant.	(*iii*) p. 165. The Board agreed with the opinion of the Research Committee and did not recommend the scheme for a grant.
	(*iv*) Combustion of Pulverized Coal by Dr. B. Ghosh, College of Engineering & Technology, Calcutta. The Committee considered that the scheme was too vague and recommended that Dr. Ghosh be requested to submit more concrete proposals.	(*iv*) p. 165. The Committee endorsed the recommendation of the Research Committee.	(*iv*) p. 165. The Board endorsed the recommendation of the Research Committee.
	7. PUBLICATIONS: The Committee noted with satisfaction the technical publications and recommended that the annual reports of the Fuel Research Institute may also be printed in future.	7. p. 165. The Committee recommended that Annual Report of the Fuel Research Institute be published in printed form.	7. p. 165. The Board endorsed the recommendation of its Committee.
LV	*Subject*: **Proceedings of the Coal Blending and Coking Research Sub-Committee.** (*Chairman*: *Mr.S.K. Nanavati*). *Synopsis*: 1. Meetings of the Coal Blending and Coking Research Sub-Committee were held on the 22nd October 1952 and 6th January 1953 at Jamshedpur.	XLV. **Coal Blending and Coking Research Sub-Committee.** 1 p. 165. The Committee noted.	XLV. **Coal Blending and Coking Research Sub-Committee.** 1 p. 165. The Board noted.
	2. The Committee noted that during the first seven months of the financial year 1952-53, on account of installation of coke breeze grinder and modification of pilot coal washing plant, expenditure under 'Contingencies' had gone up with the result that the balance of grant left under this head for the next five months would be insufficient. The Committee recommended that the requisite amount of Rs. 2,500 approximately may be re-appropriated from the head 'Staff' under which some savings was expected.	2 p. 165. The Committee endorsed the recommendation of the Research Committee.	2. p. 165. The Board endorsed the recommendation of the Research Committee.

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	3. RENEWAL:
	The total estimated expenditure for the year 1953-54 was Rs. 86,400. TISCO had already accorded sanction for their share of Rs. 47,900. The C.S.I.R. share of recurring expenditure would be Rs. 38,500 for which renewal was recommended.
	4. PROGRAMME OF WORK :
	(*a*) Tests with Kargali Seam Coal, Bokaro.
	The results of the pilot oven tests indicated that medium hard coke was obtained from 100% Kargali seam coal, the grain size being 80% through 1/8" and hard coke could be obtained from 100% Kargali seam coal, grain size being 100% through 1/8", and that there was considerable improvement in the Breslau and Haven stability factor when the coal was selectively crushed. Encouraging results obtained by crushing and re-mixing of finely ground plus 1/8" fraction of coal carbonised would prove invaluable from the point of view of conservation of coking coal. The Committee recommended full oven tests using 100% Kargali seam coal with a grain size (i) 80% through 1/8", (ii) 100% through 18", selectively crushed.
	(*b*) Tests with Choitodih 13 & 14 Seam Coal, Jharia.
	Pilot oven tests were carried out with the object of ascertaining the possibility of blending high ash coals from the Jharia coal with Bokaro washed coal at the request of Messrs. Tatas. The results indicated that hard coke was obtained from 100% Choitodih 13 and 14 seam coal individually and the blends containing 30 to 50% of Choitodih 13 and 14 seam coal in admixture with requisite proportions of West Bokaro washed coal. The Committee recommended pilot oven tests blending 20% of Choitodih 13 & 14 seam coal with 55% of Tatas 'B' schedule coal mixture to study the effect of high ash coal on the quality of coke produced when blended with coking coal mixture.
	(*c*) Tests with Sijua 15 & 26 Seam Coal, Jharia.
	These tests were carried out to ascertain the possibility of blending high ash coals from the Jharia field with West Bokaro washed coal at the TISCO coke ovens as requested by the Steel Company. Results showed that hard coke could be obtained from 100% Sijua 15 & 16 seam coal individually and the blends containing 40 to 60% of Sijua seam coal in admixture with requisite proportions of West Bokaro washed coal. The Committee recommended pilot oven tests blending 25% of Sijua 15 & 16 seam coal in admixture with 55% of Tatas 'B' schedule coal mixture and 25% of Tatas 'A' schedule coal mixture.
	(*d*) Tests with Jamadoba Washed Coal :
	The object of these tests was to study the influence of grain size of the charging coal on the quality of coke produced when coals were carbonised which were about 3 to 4% higher in

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
3. p. 167. The Committee recommended renewal of the Research Scheme on Coal Blending and Coking. The following grant was recommended. Equipment — unspent balance Contingencies — Rs. 10,000 Staff — Rs. 28,500 (including allowances) Total — Rs. 38,500 (plus unspent balance under 'Equipment')	3 p. 167. The Board endorsed the recommendation of its Committee.

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	volatile matter content than at present used in Tatas coke ovens. Results indicated that medium hard coke was obtained from 100% Jharia washed coal, the grain size being 80% through 1/8". The Committee recommended pilot oven tests with Jamadoba washed coal carbonising at higher flue temperature to study the influence of rate of heating on the quality of coke produced. 5. Particulars regarding full oven test with the blend of Poniati seam coal had already been sent to the Director, F.R.I. Results of pilot oven tests on Dishergarh, Poniati, Badjna and Kasta seam coals indicated that a maximum of 40% of these coals could be blended with good coking coals from the Jharia field to yield good coke. Further tests with Raniganj coals were deferred as the *Ad hoc* Committee on Blending of Coals had recommended that coals which had other uses should not be used for blending. The Committee suggested the preparation of an estimate of cost of washing wagon load samples at the Jamadoba washery. Operational difficulties made it difficult to wash coal samples at the pilot washing plant in the C.B.C.R. Laboratory. TISCO had been requested to arrange to supply one wagon load of sample coal from each seam, Jharia 10 & 11 for trials. The Committee recommended pilot oven tests with raw and washed fraction of Jharia 10 & 11 seam coals as early as possible. Director, F.R.I. had suggested study of the influence of grain size of coal carbonised on the quality of coke produced with special reference to Kargali and Bermo seam coals from the Bokaro field and 10 and 11 seam coals from the Jharia field. In view of the encouraging results obtained by selective crushing, it was decided to apply this method to all coals in future. Suggestion regarding use of West Bokaro washed coal for blending purposes at the C.B.C R. Laboratory instead of Tatas coke ovens coal mixture: The quality of coal from the same seam varies whereas the quality of Tatas coke ovens coal mixture was not much varying. The Chairman remarked that in future the major portion of the blend at TISCO Works would consist of washed coal. It was advisable to use West Bokaro washed coal for blending purposes. It was decided to use preferably Tatas coke oven mixture and carry out a few repeat tests with West Bokaro washed coal. Director, F.R.I. remarked that the C.B.C.R. Sub-Committee had done valuable work and the investigations on West Bokaro coals would be of immense value to the projected steel plants. The Chairman considered that the work of the scheme should be carried out in conjunction with the future plans envisaged by the Government regarding the projected steel plants and the Committee could undertake investigations which have a direct bearing on the coals to be employed in those plants in future.

Recommendations of the Committee of the Board.	Recommendations of the Board.
4 & 5 p. 167-169. The Committee noted with satisfaction the progress of work in the scheme and also recommended that the programme of work for the year 1953-54 as laid down by the Research Committee be approved.	4 & 5 p. 167-169. The Board noted and endorsed the recommendation of its Committee.

PROCEEDINGS OF THE INTERNAL COMBUSTION ENGINES RESEARCH COMMITTEE

Item No.	*Particulars.*
XLVI	*Subject*: **Proceedings of the Internal Combustion Engines Research Committee.** (*Chairman*: *Dr. J. C. Ghosh*).

Synopsis:

1. A meeting of the Internal Combustion Engines Research Committee was held on the 4th January 1953 at Lucknow. Members of the Gas Turbine Sub-Committee were also present.

2. SCHEMES IN PROGRESS:

(*i*) Development of Heavy Duty Parts of I.C. Engines by Prof. Havemann, Bangalore.

Regrant of Rs. 10,000 earmarked for fabrication of a fatigue testing machine was recommended. As regards the additional grant of Rs. 15,000 for centrifugal casting machine and other test rigs to take up the study of cylinder liners and piston rings, it was suggested that the Ordnance Factories and Automobile firms may be addressed for assistance. Rs. 7,000 was recommended under contingencies (Rs. 5,000 towards dynamic tests). One Engine Operator and One Cleaner were also recommended in addition to the present staff. It was also suggested that research scholars may be associated with the development work instead of salaried staff as far as possible. Prof. Havemann reported the difficulties in getting the connecting rod cast. As the equipment for testing this under simulating stresses was not available, the design on it had been started.

(*ii*) Hot Air Engines and Their Development by Prof. Havemann.

The Committee recommended the re-grant of the unspent balance of Rs. 10,000 and additional grant of Rs. 5,000 under equipment for instrumentation, component parts, cost of construction etc., Rs. 1,000 under contingencies and staff as at present. It was also recommended under 'Staff' that a Junior Research Assistant may be taken on higher starting salary if suitably qualified.

(*iii*) Design and Development of Air-cooled Aero-otto Engine at Indian Institute of Science, Bangalore.

The Committee recommended the following renewal grant:—

Equipment	...	Nil
Contingencies (towards cost of petrol, oil, renewal of components parts etc.)	...	Rs. 12,000
Staff (One Sr. Research Asst. in addition to the two Draftsmen and one Pattern Maker already available).	...	Rs. 9,540 (inciuding allowances).
Total		Rs. 21,540 (including allowances).

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
XLVI **Internal Combustion Engines Research Committee.**	XLVI. **Internal Combustion Engines Resea Committee**
1. p. 171. The Committee noted.	1. p. 171. The Board noted.

2 (*i*), & (*ii*) p. 171.

The Committee recommended renewal of the following schemes with the grants noted against each.

(*i*) **Development of Heavy Duty Parts of Internal Combustion Engines by Prof. Havemann.**

Equipment	Unspent balance
Contingencies	Rs. 5,000
Staff (1 S.R.A. 1 Draftsman 2 Mechanics)	Rs. 9,560 (including allowances)
Total	Rs. 14,560 (plus unspent balance under equipment.)

(*ii*) **Hot Air Engines and their Development by Professor H.A. Havemann.**

Equipment	Unspent balance
Contingencies	Rs. 1,000
Staff (1 J.R.A. 1 Mechanic 1 Stat. Assist.)	Rs. 7,153 (including allowances)
Total	Rs. 8,153 (plus unspent balance under equipment)

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	The Committee noted that the Ministry of Defence had expressed their inability to help the scheme. Prof. Havemann stated that he would be able to carry out the scheme provided the Hindusthan Aircraft Factory gave the necessary help. He wanted an electric dynamo-meter for testing the units. The Committee recommended that Dr. V.M. Ghatage be requested to put up proposals explaining the necessity for an electric dynamometer to be installed at the Indian Institute of Science as it would be useful for Defence Department work also. (*iv*) Development of Gas Turbine and Jet Propulsion Unit by Dr. S. R. Sen Gupta, Bengal Engineering College, Howrah. The Committee recommended the following renewal grant :— Equipment ... Nil Contingencies (including the various tests). ... Rs. 20,000 Staff ... Rs. 18,909 (including allowances). Total Rs. 38,909 (including allowances).		2 (*i*), (*ii*), (*iii*) & (*iv*) p. 171-173. The Board considered that research on Gas Turbines and Jet Propulsion engines should be carried out on an adequate scale to be effective. The Board endorsed the recommendation of its Committee for the appointment of a Sub Committee with the personnel suggested to consider the subject in detail and make recommendations. The Board also recommended that an eminent engineer-scientist preferably Prof. Ricardo of the United Kingdom be invited to advise on research, development and manufacture of gas turbines and jet propulsion units in India. He will also act as Expert-Member of the Sub-Committee. It was also recommended that the Sub-Committee may meet and formulate its own terms of reference before the arrival of the Expert. Meanwhile work under the scheme will continue as at present for which the D.S.I.R. may sanction necessary funds. (Note: The Governing Body nominated Mr. J.R.D. Tata as Chairman of the Sub-Committee in place of Mr. J.J. Ghandy.)
	(*v*) Development of a Flash Steam Generator by Mr. R.K. Mukherjee, Uttarpara, West Bengal. Comments of Prof. Havemann in consultation with Prof. Thacker on the scheme were noted. The report on the personal visit by Mr. Y.P. Varshney of the Central Glass and Ceramic Research Institute was also noted. It was recommended that Mr. Mukherjee be asked to submit to the Chairman the details of specific help needed by him for carrying out the scheme on the basis of a joint patent by the C.S.I.R. and the investigator.		(*v*) p. 173. The Board endorsed the recommendation of the Research Committee.
	3. Prof. Havemann reported on the work undertaken in the Internal Combustion Engines Laboratory of the Indian Institute of Science with regard to instruction and research on gas turbines.		3. p. 173. The Board noted.
	4. The Chairman reported that proceedings of the symposium on 'Problems Relating to the Development of Internal Combustion Engine Industry in India' held in Bangalore had been edited and sent to the C.S.I.R. for publication.		4. p. 173. The Board noted.
	5. The Committee considered the progress report in the scheme on 'Electro-polishing of bearing surfaces in relation to ferrous metals and alloys used in mechanical and internal combustion engineering' which was under the auspices of the Metals Research Committee and discussed the question of transferring the scheme to the Electro-Chemical Research Institute at Karaikudi. The Committee recommended that Prof Thacker and Prof. Brahm Prakash be requested to forward their recommendations.		5. p. 173. The Board endorsed the recommendation of its Committee.

Item No.	Particulars.
	6. The Committee endorsed the following recommendations of the Gas Turbine Sub-Committee held earlier in the day:—
	(*i*) Research Scheme on Development of Gas Turbine and Propulsion Unit by Dr. S.R. Sen Gupta.
	Dr. Sen Gupta reported that work on the compressor had yielded quantitative results and efficiency of even 0.75 at low velocities had been obtained. He showed a specimen sample of alloy steel smelted and specimens of the duraluminium compressor blades and the gas turbine steel blades developed in the scheme. Characteristic performance curves of compressor unit and drawings of the combustor units developed were also shown. With regard to his difficulties in procuring materials, Dr. Kothari and Dr. Ghosh offered help and Dr. Sen Gupta was requested to submit his requirements.
	(*ii*) Prof. Havemann gave an account of the work done in his laboratory on gas turbine technique. They had (a) developed a method of injecting solid fuels of 20 to 50 microns size into combustor chamber; (b) developed a gasifier on cyclone principle; and (c) investigated the means of separation of solid particles from the gases. Investigations on cooling of gas turbine blades were also being carried out. These would be incorporated in the final design and development of the gas turbine and jet propulsion unit. Work on compressor and combustion chamber testing had been completed and gas turbine test rig was being built. The question of low speed turbines which might be useful for the army was deferred for further consideration. Dr. Kothari was requested to inform about any condemned Dervent-V engine or any other similar engine before passing it on to the Disposals.
	(*iii*) Notes from Dr. G.P. Chatterjee, Bengal Engineering College on material problems of gas turbine and testing of materials were discussed.
	Dr. Chatterjee was asked to furnish the specifications so that part of the steel that had been obtained for the High Pressure Technique Laboratory in the Indian Institute of Technology, Kharagpur might be diverted to the Bengal Engineering College if suitable. He might also investigate the possibility of using armoured plates of old tanks. Dr. Sen Gupta reported that each melt to produce specimens needed a couple of hundred rupees and the funds allocated for the scheme were insufficient. Dr. Chatterjee was also asked by the Chairman to contact the National Metallurgical Laboratory regarding creep testing of materials.
	(*iv*) The programme of research on the design and development of a locomotive gas turbine unit in the Internal Combustion Engines Laboratory of the Indian Institute of Science in co-opration with the Fuel Research Institute, as suggested by the Railway Board, was discussed. The Railway Board had offered (*a*) assistance in arranging for the manufacture of any part or parts ; (*b*) supply of coal of the type for which the gas generator to be designed is intended ; and

Recommendations of the Committee of the Board.	Recommendations of the Board.
6. (*i*) & (*ii*) p. 175. The Committee noted the progress of research on Gas Turbine under the direction of Dr. S.R. Sen Gupta, Calcutta, and Prof. Havemann, Bangalore and endorsed the recommendations of the Research Committee.	6. (*i*) & (*ii*) p. 175. The Board noted and endorsed the recommendations of the Research Committee.
(*iii*) p. 175. The Committee endorsed the recommendation of the Research Committee.	(*iii*) p. 175. The Board endorsed the recommendation of the Research Committee.

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(c) assistance in providing liaison with research establishments in Europe. Mr. Kumar, Director of Research, Ministry of Railways stated that Railway Board was buying for experimental test a coal burning gas turbine unit at an estimated cost of £ 60,000 and the Research Committee need not expect any help from the Railway Board for this investigation. The Committee considered that the problems connected with heat transfer were of fundamental importance and design of combustors for different grades of coal and their relative efficiency may have to be tackled irrespective of the decision of the Railway Board. It was recommended that the work on the problem will be continued with such help as the Railway Board may give. Dr. Whitaker was also requested to take up the design of combustors for different grades of coal and their relative efficiency and that heat transfer problems which needed physico mathematical background be taken up at the Indian Institute of Science, and Bengal Engineering College and other suitable centres.	(iv) p. 175-177. The Committee generally agreed with the opinion of the Research Committee but was of the view that since the Railway Board was obtaining an experimental gas turbine unit, it would be more appropriate for the Fuel Research Institute and the Indian Institute of Science to collaborate with the Railway Board rather than take up investigations independently.	(iv) p. 175-177. The Board agreed with the views of its Committee.
	(v) Dr. M.L. Ghai of the National Physical Laboratory had informed that he had the personnel and equipment for conducting experiments on heat transfer, experimental and theoretical. Dr Atma Ram informed that he had facilities for carrying out tests on spalling resistance and corrosions	(v) p. 177. The Committee noted.	(v) p. 117. The Board noted.
	(vi) Comprehensive programme of Gas Turbine Research at the Indian Institute of Science and the Bengal Engineering College for the next five years. Since the funds asked for by the investigators were of large magnitude, it was suggested that the developmental work on gas turbine be sectionalised and worked at different places so that the combined results may ultimately yield a prototype unit. The Committee was also of the opinion that as the two units that were being developed were of axial flow and centrifugal ones a certain amount of duplication was inevitable. Dr. Kothari suggested that the merits of the two types of gas turbines had not yet been assessed even in advanced countries like U.S.A. and U.K. and therefore it would be better to concentrate on problems of immediate utility such as increasing the life of the existing units under Indian conditions and arranging indigenous manufacture of these by copying the prototype and solving problems in the course of such development. Dr. Sen Gupta stated that the objective of his project was development of a low power stationary unit. Prof. Havemann stated that his object was development of a medium power stationary unit. Dr. Whitaker suggested that question of efficiency of gas turbine units in relation to diesel engines may also be considered, since the range of these units were covered by diesel engines. Dr. Sen Gupta was sure about the success of the scheme and wanted to continue his work. The Chairman suggested that Dr. Sen Gupta may be present at the next meeting of the B.S.I.R. to explain the need for carrying out these projects on the present lines. The Committee recommended that the proposals on the Five Year Plan submitted by Dr. Sen Gupta and Prof. Havemann may be considered after two years in the light of experience		

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	gained in the current schemes. Prof. Havemann was requested to contact the National Instruments Factory with regard to instrumentation. It was also recommended that Prof. Havemann, Dr. Sen Gupta, Dr. Whitaker and Dr. Atma Ram prepare a scheme relating to sectionalised research and development work on gas turbines before the end of January 1953 to be placed before the B.S.I.R.	(*vi*) p. 177-179. The Committee agreed with the opinion of the Research Committee, that a comprehensive programme of Gas Turbine Research would require considerable additional funds, which would not be available at present. The Committee, therefore, recommended that Prof. Havemann and Dr. Sen Gupta be requested to prepare suitable short-range schemes on various sections of Gas Turbine Research.	(*vi*) p. 177-179. The Board agreed with the opinion of the Research Committee and endorsed the recommendation of its Committee.
LVII	*Subject*: **Proceedings of the Metals Research Committee.** (*Chairman: Mr. J.J. Ghandy*). *Synopsis*: 1. A meeting of the Metals Research Committee was held in Calcutta on the 29th December, 1952. Mr. Jehangir Ghandy said that metallurgical research had made considerable progress in recent years. The Metals Research Committee had encouraged research in various centres and the National Metallurgical Laboratory offered full facilities for conducting fundamental and applied research. Members of the Research Committee should now make special efforts for the formation of Co-operative Industrial Research Associations of metallurgical industries. The large number of ferrous and non-ferrous foundries in India could join together and put up their problems to the National Laboratories under a Fellowship plan. The foundries could later set up their own specialised laboratories. On a querry from Mr. Bhatawadekar, the Chairman stated that investigations of interest to the Railways exclusively, could be directly referred to the National Metallurgical Laboratory and the Railway Board should pay for the research work. Problems of wider interest and of national importance should be referred to the Metals Research Committee who would try and arrange for the research work to be undertaken at the most suitable place either in a private laboratory, university or the National Metallurgical Laboratory. 2. POINTS ARISING OUT OF THE MINUTES OF THE LAST MEETING: The Chairman remarked that before renewal of the grants was recommended, the investigators should furnish complete details as to how the grant had been spent in the previous year to enable consideration of the grant required for the current year. Members of the Committee should, when convenient, visit the laboratories where research was in progress and discuss the problems with the investigators to ensure that the grant was spent properly.	XLVII. **Metals Research Committee.** 1. & 2. p. 179. The Committee endorsed the suggestions made by the Chairman, Metals Research Committee.	XLVII. **Metals Research Committee.** 1 & 2. p. 179. The Board endorsed the suggestions made by the Chairman, Metals Research Committee.

PROCEEDINGS OF THE METALS RESEARCH COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	3. SCHEMES IN PROGRESS: (*i*) Investigation on the Production and Properties of Low Carbon Alloy Steels Containing 1 to 5% Manganese made with Electrolytic Manganese.—Dr. H. Schrader, Tisco Ltd., Jamshedpur. Dr. Schrader explained that electrolytic manganese metal was expeted to arrive shortly from the U.S.A. when the work would be taken up. (*ii*) Studies in Copper Rich Portion of the Copper-Titanium System—Prof. G.K. Ogale, Poona. Prof. Ogale had been able to obtain argon gas and the high frequency unit had been modified to suit melting in an atmosphere of argon. The Committee *recommended that Prof. Ogale, should be requested to send complete experimental details of the work.* (*iii*) Effect of Gases in Steel—Dr. S. R. Sen Gupta. It was noted that the investigation was being conducted in two phases: (*a*) Effects of hydrogen in steel and (*b*) Studies on over-heating. Dr. Schrader remarked that the subject "the effect of hydrogen in steel" in itself covered a vast field and should be separated from "gases in steel" and the research work should be confined to this part in the first instance. After completion of this "studies on overheating" could be taken up. This was agreed to and the Committee *recommended the scheme for renewal.* (*iv*) Production of Aluminium Metal by the Electrolysis of Molten Anhydrous Aluminium Chloride—Dr. E.G. Ramachandran, Bangalore. Mr. Bhatawadekar complimented the research workers on the orderly way in which the investigation had been conducted. On enquiry from Dr. Schrader it was explained that the particular sample of bauxite chosen might not have contained titanium, as Salem bauxite available locally was free from titanium. Dr. Whitaker said that the complications that might be introduced by the presence of the titanium oxide should be examined. Dr. Schrader suggested that investigation should also be carried out on bauxite samples from Bihar and other areas which contained titanium. The *renewal was recommended.* (*v*) Electro-refining and Recovery of Copper from Copper Scrap (including alloys)—Mr. G.C. Mitter, Bombay. Experiments for the chlorination of brass and the recovery of cuprous chloride and also the recovery of cuprous chloride and elemental sulphur from copper pyrites had been made. The Committee *recommended the renewal of the scheme.*	3 (*i*), (*ii*), (*iii*), (*iv*) & (*v*) p. 181. The Committee recommended continuance of the following research schemes during 1953-54 and sanction of the grants indicated against each. (*i*) **Production & Properties of Low Carbon Alloy Steels—Dr. H. Schrader.** Regrant of Rs. 9,700 under contingencies placed at the disposal of the investigator during 1952-53. (*ii*) **Copper-Titanium System—Prof. G.K. Ogale.** Application not received. (*iii*) **Gases in Steel—Dr. Sen Gupta.** Equipment — Nil Contingencies — Rs. 1,000 Staff: (2 J.R.A's) — Rs. 6,629 (including allowances) Total — Rs. 7,629 (including allowances) (*iv*) **Aluminium by Electrolysis of Molten Anhydrous Aluminium Chloride—Dr. E.G. Ramachandran.** Equipment — Nil Contingencies — Rs. 1,000 Staff: (1 J.R.A. 1 S.L.A.) — Rs. 5,368 (including allowances) Total — Rs. 6,368 (including allowances) (*v*) **Recovery of Copper from Copper Scrap—Mr. G.C. Mitter.** Equipment — Nil Contingencies — Rs. 1,000 Staff: (1 J.R.A.) — Rs. 3,080 (including allowances) Total — Rs 4,080 (including allowances)	3 (*i*), (*ii*), (*iii*), (*iv*) & (*v*) p. 181. The Board endorsed the recommendations of its Commitree.

Item No.	*Particulars.*
	(*vi*) Investigation into the Making of Briquettes for Charging in the Low Shaft Furnace—Dr. D. Jagat Ram, Tisco, Jamshedpur. The above research scheme had been submitted by Tata Iron & Steel Co. to carry out preliminary work in connection with the study of the properties of raw materials for briquetting. The equipment had been built for preliminary experiments, which would have to be repeated later in a rotating void briquette press, if such an equipment were available within the low shaft furnace scheme. The *renewal of the scheme was recommended.* (*vii*) Electro-Polishing of Bearing Surfaces in Relation to Ferrous Metals and Alloys— Prof. M.S. Thacker & Prof. Brahm Prakash, Bangalore. Preliminary work on electro-deposition of porous chromium on high duty cast iron had been done. The electro-polishing of cast iron was also taken up with a view to study its influence on the nature of the electroplate. Porous chromium plating on the basis metal—ferrous and non-ferrous, was one of the notable advances that had been made for the improvement of bearing surfaces. Porous chromium plating of piston rings of engines increased the life both of the cylinder and the piston ring. The Committee *recommended the renewal of the scheme.* Dr. Contractor pointed out that the Railway Board were also interested on the electro-polishing of bearing surfaces. He would write to the investigators in Bangalore. (*viii*) Aluminium Coating of Steel—Dr. Brahm Prakash, Bangalore. The investigation was being carried out for the development of a suitable method for determining the adhesive strength of hot-dipped coating on steel. The Committee *recommended the renewal of the scheme.* (*ix*) Studies on Binary and Ternary Alloys Systems with Titanium as one of the Alloying Constitutents—Dr. G.P. Chatterjee, and Dr. B. Chatterjee, Howrah. *Renewal of the scheme was recommended.* (*x*) Studies on Corrosion of Metals and Alloys with Special Reference to the Effect of Titanium—Dr. G.P. Chatterji and Dr. B. Chatterjee, Howrah. Brass samples containing different amounts of titanium had been prepared. The corrodability of these samples in sea water was being investigated.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
(*vi*), (*vii*), (*viii*) & (*ix*) p. 183. The Committee recommended renewal of the following research schemes and sanction of the grants noted against each: **(*vi*) Briquettes for Low Shaft Furnace—Dr. Jagat Ram.** Equipment — Nil Contingencies. — Rs. 150 Staff: (1 J.R.A., 1 S.L.A. 1 Lab. Att.) — Rs. 1,968 (including allowances) Total — Rs. 2,118 (including allowances) for 4 months. **(*vii*) Electro-Polishing of Bearing Surfaces—Prof. Thacker and Prof. Brahm Prakash.** Equipment — Unspent Balance. Contingencies — Rs. 1,000 Staff: (1 S.R.A. & 1 J.L.A.) — Rs. 6,840 (including allowances) Total — Rs. 7,840 (including allowances) **(*viii*) Aluminium Coating of Steel—Dr. Brahm Prakash.** Equipment — Unspent Balance. Contingencies — Rs. 1,000 Staff: (1 J.R.A. & 1 Mechanic). — Rs. 4,440 (including allowances) Total — Rs. 5,440 (including allowances plus unspent balance under Equipment) **(*ix*) Binary and Ternary Alloys with Titanium—Dr. G.P. Chatterjee and Dr. B. Chatterjee.** Equipment — Nil Contingencies — Rs. 1,000 Staff: (1 J.R.A.) — Rs. 3,400 (including allowances) Total — Rs. 4,400 (including allowances)	(*vi*), (*vii*), (*viii*) & (*ix*) p. 183. The Board endorsed the recommendations o Committee.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	The Committee noted with satisfaction the progress and *recommended the renewal of the scheme.* (*xi*) Mineragraphic Study of Magnetite Ore Minerals with Special Reference to Genesis, Ore Dressing etc.—Prof. N.N. Chatterjee, Calcutta. The Chairman suggested that the above research scheme should be examined by Dr. M.S. Krishnan. He might also discuss the subject with the investigator and send a report to the Committee. The Committee *recommended that the renewal of the research scheme be confirmed after receipt of Dr. Krishnan's report.* (*xii*) Preparation and Properties of High Purity Titanium Metal—Dr. D. Swarup and Mr. S. Ramamurthy, Banaras. The investigators had invented a new process for the preparation of titanium tetra-iodide, which was essential for the preparation of high purity titanium metal. The Committee *recommended the renewal of the scheme.* (*xiii*) Pilot Plant Experiments on Modified Aluminothermic Reduction of Titanium and other Refractory Oxides—Dr. D. Swarup and Mr. S. Ramamurthy, Banaras. The Committee *recommended the renewal of the scheme.* 4. ESTABLISHMENT OF ZINC INDUSTRY IN INDIA: The Chairman stated that the Zinc Committee of the Government would submit its report to the Government shortly. He gave a brief account of his visit to Zawar Mines. The zinc ore reserves appeared to be sufficient to start a zinc industry in India. However, it was necessary to prove the quantity and quality of the reserves. The Committee agreed that for the time being this *subject should be dropped from the Metals Committee's deliberations.* 5. NEW SCHEMES: (*i*) Iron Production with Non-coking Coals on Pilot Plant Scale. (Discussion and recommendation of the Metals Research Committee on this scheme are given under Item No. XXXII pages 71-73 of this agenda). (*ii*) Production of Electrolytic Manganese Metal. Dr. Contractor explained that the C.S.I.R. had approved the pilot plant for electrolytic manganese at the National Metallurgical Laboratory. Provision had been made in the revised budget of the Laboratory, for the current year. (*iii*) Manufacture of Malleable Castings in India by Dr. D.R. Malhotra, Ajmer. Dr. Contractor said that it was expected that the Railway Board would finance the research work if undertaken at the National Metallurgical Laboratory.	(*x*), (*xi*), (*xii*) & (*xiii*) p. 183-185. The Committee recommended renewal of the following research schemes with the grants noted against each for the year 1953-54. (*x*) **Corrosion with special reference to Effect of Titanium—Dr. G.P. Chatterjee & Dr. B. Chatterjee.** Equipment: Nil Contingencies: Rs. 1,000 Staff: (1 J.R.A.): Rs. 3,177 (including allowances) Total: Rs. 4,177 (including allowances) (*xi*) **Mineragraphic Study of Magnetite Ore Minerals—Prof. N.N. Chatterjee.** Equipment: Unspent balance. Contingencies: Rs. 500 Staff: (1 J.R.A.): Rs. 3,540 (including allowances) Total: Rs. 4,040 (including allowances plus unspent balance under Equipment.) It was recommended that the above grant may be placed at the disposal of the investigator after receipt of Dr. M.S. Krishnan's report. (*xii*) **High Purity Titanium—Dr. Swarup and Mr Ramamurthi.** Equipment: Rs. 1,000 Contingencies: Rs. 1,000 Staff: (1 J.R.A. 1 Lab. Att.): Rs. 4,674 (including allowances) Total: Rs. 6,674 (including allowances) (*xiii*) **Alumino-thermic Reduction of Titanium—Dr. Swarup & Mr. Ramamurthy.** Equipment: Nil Contingencies: Rs. 1,500 Staff: (1 J.R.A.): Rs. 2,650 (including allowances) Total: Rs. 4,150 (including allowances) 4. p. 185. The Committee noted. 5. (*i*) p. 185. The Committee noted that the scheme had already been considered under item XXXII p. 71-73 of this agenda. (*ii*) p. 185. The Committee noted.	(*x*), (*xi*), (*xii*) & (*xiii*) p. 183-185. The Board endorsed the recommendations of it Committee. 4. p. 185. The Board noted. 5. (*i*) p. 185 The Board noted. (*ii*) p. 185. The Board noted.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	Dr. Schrader pointed out that the problem of malleable iron industry in India was mainly a question of reducing the phosphorous content in the pig iron and this was also linked up with the research scheme on Utilisation of Steel Scrap and Production of Low Phosphorous Pig Iron. (Item No. (*vi*) page 187 below).		
	It was *agreed to form a Sub-Committee* consisting of the representatives of the Railway Board, the Ag. Director of National Metallurgical Laboratory and Dr. Schrader, *to draw up a scheme of research and also to recommend a suitable place*, preferably any of the Railway Workshops, where the investigation could be crried out.		
	At the suggestion of Mr. Kapur the title of the research scheme was changed to "Production of Suitable Pig Iron for the Manufacture of Malleable Castings."	(*iii*) p. 185-187. The Committee endorsed the recommendations of the Research Committee.	(*iii*) p. 185-187. The Board endorsed the recommendations of the Research Committee.
	(*iv*) Permanent Magnet Alloy and Soft Iron.		
	(*v*) Manufacture of Copper-Chromium Master Alloys.		
	Since Dr. Anjaneyulu, had not furnished details as to the objective and scope of the research work and where the research work would be conducted, the Committee *did not recommend any action.*	(*iv*) & (*v*) p. 187. The Committee noted.	(*iv*) & (*v*) p. 187. The Board noted.
	(*vi*) Utilisation of Steel Scrap.		
	The utilisation of steel scrap for melting in cupolas would be considered in connection with the research on the production of suitable quality of pig iron for the manufacture of malleable castings. (*vide* Item No. (*iv*) on page 185-187 above).	(*vi*) p. 187. The Committee noted.	(*vi*) p. 187. The Board noted.
	The Chairman would write to the author explaining the difficulty in utilising all the available steel scrap within the country.		
	(*vii*) Reduction of Metallic Oxides from Blast Furnace Slags.		
	It was *recommended that Dr. Schrader may put up a proper research* scheme for further consideration by the Committee.	(*vii*) p. 187. The Committee endorsed the recommendation of the Research Committee.	(*vii*) p. 187. The Board endorsed the recommendation of the Research Committee.
	(*viii*) Steel Direct from Ores Without Passing Through the Stage of Pig Iron or Hot Metal of Corresponding Composition by Prof. Ogale.		
	The Committee desired that clarification with regard to the scope of the research work be obtained for reconsideration.	(*viii*) p. 187. The Committee recommended that Prof. Ogale be requested to give the information desired by the Research Committee.	(*viii*) p. 187. The Board endorsed the recommendation of its Committee.
	(*ix*) Utilisation of Vanadium Bearing Iron Ore in India as a Source of Vanadium for Making Alloy and Tool Steels.		
	Dr. Schrader explained that a considerable amount of work had been carried out during the war period by the National Vanadium Trust Ltd. and also the Tata Iron & Steel Company,		

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	for the recovery of vanadium in the vanad-ferrous magnetite ores. As the scheme did not explain the proposed method, they may be asked to give full details of the process, for further consideration.		
	(*x*) Effects of Stress on Phase Transformations with Special Reference to High Alloy Steel. The Committee *did not recommend the research scheme.*	(*x*) p. 189. The Committee did not recommend the Scheme.	(*x*) p. 189 The Board did not recommend the scheme.
	(*xi*) Studies on the Phenomenon of Ageing with Special Reference to the Light Alloys by Dr. S.R. Sen Gupta. It was *recommended that the investigator be asked to clarify* details of the actual work proposed.	(*xi*) p. 189. The Committee endorsed the recommendation of the Research Committee.	(*xi*) p. 189. The Board endorsed the recommendation of the Research Committee.
	6. ANY OTHER SUBJECTS : (*i*) *Symposia* : It was recommended that the National Metallurgical Laboratory and the Metals Research Committee may co-operate with the Fuel Research Institute in their proposed symposium on 'Coal Washing and Benefication of Economic Minerals'. Mr. Bhatawadekar suggested that potentialities of production of non-ferrous metals in the country, their usage and the present supply position could be discussed. Mr. Kapur said that the use of waste materials from the metallurgical industries would be an intereting subject. It was suggested that the two proposals may be taken into consideration. It was recommended that the National Metallurgical Laboratory may organise a symposium and the Ag. Director N.M.L. should select a suitable subject and write to the Council before the 10th January, 1953.	6 (*i*) p. 189. The Committee noted that the subject had already been considered under item No. XXXVI p. 89-93 of this agenda.	6 (*i*) p. 189. The Board noted.
	(*ii*) Letter from Messrs. Steel Corporation of Bengal asking that Metals Research Committee's considered views on the following subjects :— (*a*) Susceptibility of "Duplex Steel" to ageing as compared with straight open hearth steel. (*b*) Fine grain steel versus rimming steel in relation to heavy cold working. (*c*) Possibility of developing Bessemer steel in India. It was recommended that Dr. Schrader be requested to answer the points raised and that the information given by him be circulated to the members.	(*ii*) p. 189. The Committee endorsed the recommendation of the Research Committee.	(*ii*) p. 189. The Board endorsed the recommendation of the Research Committee.
	(*iii*) The Chairman suggested that the next meeting of the Research Committee may be held in May or June, 1953.	(*iii*) p. 189. The Committee noted.	(*iii*) p. 189. The Board noted.

PROCEEDINGS OF THE BUILDING RESEARCH COMMITTEE

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
XLVIII	*Subject* : **Proceedings of the Building Research Committee** (*Chairman* : *Late Sardar Teja Singh Malik*). *Synopsis* : 1. A meeting of the Building Research Committee was held on the 30th August 1952 at Roorkee. The Committee passed a resolution of condolence on the death of Dr. A.H. Pandya, a former member of the Research Committee. 2. On a point raised by Dr. Zipkes, the Committee decided that the draft proceedings of the Research Committee should be circulated to all members as early as possible for comments before finalising the proceedings which will be circulated again for confirmation at the next meeting. 3. MATTERS ARISING OUT OF THE LAST MEETING. (*a*) The Committee discussed the difficulties, especially the lack of residential accommodation at Roorkee, which was in the way of recruiting technical staff to the Central Building Research Institute and *recommended that construction of adequate residential accommodation should be given the highest priority*. In view of the fact that some time would elapse before the accommodation was got ready and in view of the fact that recruiting and training of staff for research would also take time, the Committee *recommended that steps should be taken to recruit staff as suitable persons become available and to attach them to other research stations in the country, e.g.*, the Hyderabad Engineering Research Laboratory, the Engineering Research Station, Roorkee, where they would work on specific problems *under the general direction of the Director of Central Building Research Institute* using the facilities and assistance available in these stations. Mr. Antia suggested that problems may also be referred to other laboratories who may be in a position to carry out research by themselves. Dr. Krishna informed the Committee that any institution requiring financial assistance for research on engineering subjects may send their applications to the Board of Engineering Research. 4. PROGRESS OF RESEARCH AT THE CENTRAL BUILDING RESEARCH INSTITUTE. (*a*) The Director of the Central Building Research Institute pointed out that most of the problems were those which had been approved by the Building Research Committee earlier. He also pointed out that scientific staff recruited were fresh men from the university. Since trained	**XLVIII. Building Research Committee.** 1. p. 191. The Committee noted. 2. p. 191. The Committee noted. 3. p. 191. The Committee noted that the Government of India had since sanctioned the construction of a Hostel at Roorkee for the staff of the Building Research Institute. The Institute would also be ready by the end of March 1953 and would be opened shortly. Recruitment of additional staff was also being taken up immediately. The Committee, therefore did not consider it necessary to place the staff at other centres of research except if absolutely necessary.	**XLVIII. Building Research Committee.** 1. p. 191. The Board noted. 2. p. 191. The Board noted. 3. p. 191. The Board noted and endorsed the views of its Committee.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	men in building research were not available in the country, the first step would naturally be to take up the study of particular subject and develop their knowledge on the subject and also to understand the technique adopted in research in that subject. Accordingly the staff was at present carrying out detailed study of various subjects and were writing notes on the present position of knowledge in each. They had been allocated research projects and the survey they were preparing would help them ultimately to tackle the problems in the particular field. A number of reviews were ready for publication and some had already been published. (*b*) Dr. Krishna referred to the work carried out in Dehra Dun on soil stabilization. The Director informed the Committee that inspite of his writing several times to the Director, Forest Research Institute, he had not received the details of the methods. He said he would very much like to try them at Roorkee. The Committee *recommended that in future accounts of progress may be given under each subject together with the names of the research workers.*	4. p. 191-193. The Committee noted and endorsed the recommendation of the Research Committee.	4. p. 191-193. The Board noted and endorsed the recommendation of the Research Committee.
	5. FUTURE PROGRAMME : As desired by the Council a list of problems had been drawn up for restricted circulation. Some of the members felt that it was difficult to carry out the programme with the existing staff. The Director stated that when the Institute was fully equipped and the recruitment of the staff completed, it would be possible to carry out the entire programme. The Committee *recommended that the list should be classified under two heads, i.e. short range programme and long range programme and circulated* to the members for comments.	5. p. 193. The Committee noted that short range and long range programmes of research for the Central Building Research Institute had since been prepared and circulated to members of the Research Committee for comments.	5. p. 193. The Board noted:
	6. (*a*) Regarding the scope and functions of the Central Building Research Institute in relation to the proposed National Building Organisation of the Ministry of Works, Housing and Supply, the Director informed the Committee that the subject was discussed at the last meeting of the B.S.I.R. and the views of the Council had already been communicated to the Government of India, that in drawing up the scope and functions of the National Building Organisation, the scope and functions of the Central Building Research Institute may be kept in view. (*b*) Regarding the proposal that the Building Research Committee may function as a co-ordinating body in consultation with the State Advisory Boards for the programme of research in the Central and State Building Research Institutes, the Director explained that co-ordination would not mean domination by the Central Institute but only a recognition of the need of some organisation so that facilities in men and material which were limited were used to the maximum advantage and unncessary duplication avodied.	6. p. 193. The Committee noted that the subject had already been considered at the last meeting of the Board and the recommendations of the Board had already been communicated to the Government of India.	6. p. 193. The Board noted.

PROCEEDINGS OF THE GLASS AND REFRACTORIES RESEARCH COMMITTEE

Item No.	*Particulars.*
IL	*Subject:* **Proceedings of the Glass and Refractories Research Committee.** (*Chairman: Dr. D.N. Wadia*) *Synopsis:* 1. A meeting of the Glass & Refractories Research Committee was held on the 12th January 1953, at New Delhi. The Chairman complimented the Central Glass and Ceramic Research Institute for the good progress made on the work entrusted to it by the Committee and wished that other research institutions and universities also organised research in ceramics. It was the business of this Committee to find out defects and shortcomings of the industry and to suggest suitable research for their removal. Mr. D.N. Sen expressed appreciation of the industry on the work done at the Institute, particularly on glass containers and saggars. Dr. Atma Ram said that work on the items under discussion did not cover the entire progress report of the Institute. 2. SURVEY OF CHINA CLAY DEPOSITS WITH PARTICULAR REFERENCE TO RAJMAHAL AND TRAVANCORE AREAS. The Committee noted that detailed investigation on Rajmahal and Travancore deposits had already been included in the programme of the Geological Survey of India and that samples would be sent to the Institute for investigation. The Board had recommended in the last meeting that in order to make the information on the survey of clay deposits in the country available to the public, a monograph should be published. The G S.I. had been collecting the information. Some information on the progress of the work had been received from the G.S.I. but complete information on the probable extent of deposits and their locality was still awaited. The Committee requested the Chairman to take up the matter with the G.S.I., so that the publication of the monograph could be expedited. 3. RESEARCH SCHEMES TRANSFERRED TO THE C.G. & C.R.I. CALCUTTA. (*a*) Chemical Porcelain: The conditions for producing chemical procelain from raw materials available in the country had been standardized and samples produced at the Institute had been tested in important chemical laboratories in the country and found to compare favourably with imported articles. A scheme for semi-commercial scale production was under consideration.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
IL. Glass & Refractories Research Committee. 1. p. 195. **The Committee noted.**	**IL. Glass & Refractories Research Committee.** 1. p. 195: **The Board noted.**
2 p. 195. **The Committee recommended that the Geological Survey of India be requested to expedite the supply of necessary data of the survey of raw materials in order that the monograph may be brought out as soon as possible.**	2. p. 195. **The Board endorsed the recommondation of its Committee.**

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	(b) Ceramic Colours and Glazes: About 12 dozen samples of colours produced at the Institute were tested at Bengal Potteries for performance under actual factory conditions and found satisfactory. Four of these colours had been produced in 20-25 lbs. lots and samples of these colours had been sent to four firms in the country for tests. The results were awaited. A scheme for the pilot plant production was under consideration (c) Better Glass Saggars: As a result of systematic work experimental saggars were produced and found satisfactory in laboratory trials. About four dozen saggars had been sent to 4 or 5 firms for performance test under factory conditions. Results of these tests were awaited but it was learnt that these saggars had shown good performance. Prof. H.N. Roy offered the facilities of his Laboratory for examination of samples of clays received from the G.S.I. and also on the utilisation of talc. 4. NEW SCHEMES. On the recommendation of the Committee at its last meeting held on the 26th February 1952, six schemes were referred to the Universities of Delhi, Banaras, Andhra, Calcutta, Madras and Nagpur. Two more schemes were received from Dr. M.L. Misra of Banaras Hindu University and from the Director, Central Laboratories for Scientific and Industrial Research, Hyderabad Out of these the Committee recommended for approval the following schemes:— (i) A Critical Examination of the Use of Nepheline Seyanite Available in India in Glass Factories by Dr. R. Charan, Head of the Department of Glass Technology, Banaras. [The object of this scheme is the utilisation of nepheline seyanite as a partial substitute for soda ash in glass making. A study of the glass composition that could be made by employing this material in Indian factories consistent with the existing conditions, without making much change, will be carried out. The work is expected to take not more than one year.] The Committee recommended the following financial assistance :— Equipment ... Nil Contingencies ... Rs. 1,000 Staff ... Rs. 2,640 (including allowances) (One Junior Res. Asst. on Rs. 160-10-330). Total Rs. 3,640 (including allowances)

Recommendations of the Committee of the Board.	Recommendations of the Board.
3. (a), (b) & (c) p. 195-197. The Committee noted with satisfaction the progress of work under the research schemes; it was recommended that these may be continued to completion.	3. (a), (b) & (c) p. 195-197. The Board noted and endorsed the recommendations of its Committee.
4 (i) p. 197. The Committee recommended that the research scheme on Nepheline Seyanite by Dr. R. Charan be approved and the following grant be made: Equipment Nil Contingencies Rs. 1,000 Staff: Rs. 2,420 (including allowances.) (1 J. R. A.) Total Rs. 3,420 (including allowances.)	4 (i) p. 197. The Board endorsed the recommendation of its Committee.

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*ii*) (*a*) Investigations on the Critical Conditions of Producing Plaster of Paris Suitable for Making Moulds and Potteries from Gypsum Available in the Country and (*b*) Utilisation of Waste Plaster of Paris Moulds by Prof. H.N. Roy, Banaras Hindu University. The conditions of producing Plaster of Paris, extensively employed in the pottery industry for making moulds would be investigated so as to give maximum service and efficiency. Simultaneously, work on the utilisation of unserviceable plaster moulds would also be taken up. The scheme would be for two years only. The Committee recommended the scheme with the following grant :— Equipment ... Nil Contingencies ... Rs. 1,500 Staff ... Rs. 5,004 (including allowances) (One Jr. Scientific Asst. on Rs. 160-10-330. One Moulder on Rs. 60-5/2-75. One Assistant Moulder on Rs. 35-1-50.) Total Rs. 6,504 (including allowances) It was also recommended that work done in the first year should be reviewed before considering extension for the second year.	(*ii*) p. 199. The Committee recommended approval of the Research Scheme on the Utilisation of Plaster of Paris for Mould Making by Prof. H.N. Roy and sanction of the following grant. Equipment Nil Contingencies Rs. 2,500 Staff : Rs. 4,587 (including allowances.) (1 J.R.A. 1 Moulder. 1 Asstt. Moulder). Total Rs. 7,087 (including allowances.)	(*ii*) p. 199. The Board endorsed the recommendation of its Committee.
	(*iii*) Studies of the Refractory and Ceramic Properties of Indian Pyrophyllite by Dr. M.L. Misra, Deptt. of Glass Technology, Banaras Hindu University. [*Object* :The object of this scheme is to study the utilisation of Indian Pyrophyllite in ceramic industry. The mineral is found in large quantity particularly in the southern districts of the Uttar Pradesh, but no work has been done on ceramic properties and its use in Indian ceramic industry. *Programme of work* : (*a*) Determination of its mineralogical nature and impurities by studying its chemical composition by chemical analysis, X-ray, microscope and electron microscope. (*b*) Study of its colloidal behaviour and determination of its base exchange capacity by electrolysis and viscosity measurements. (*c*) Study of the effect of heat by thermal expansion, differential thermal analysis and weight-loss behaviour. (*d*) Study of the ceramic properties by determining the air and firing shrinkages, porosity at different temperatures, bulk density and other fired properties		

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	(e) Determination of its use in the ceramic bodies from the study of its above properties. (f) Study of the slag attack, thermal shock-resistance and thermal expansion to determine its use as a glass refractory. *Duration* : The scheme is expected to take 2 years.] Dr. Atma Ram mentioned that in recent years the use of pyrophyllite in making refractories and other ceramic articles had received attention and felt that in view of there being no data or investigations on pyrophyllite available in India, the investigations were worth undertaking. The Committee recommended the scheme with the following grant : Equipment ... Rs. 4,000 Contingencies ... Rs. 500 Staff Nil Rs. 4,500 It was recommended that if the progress made during the year was satisfactory, it should be considered for extension. The entire work should ordinarily take two years.	(iii) p. 199-201. The Committee recommended that the Research Scheme on Indian Pyrophyllite by Dr. M.L. Misra be approved and the following grant be made: Equipment Rs. 4,000 Contingencies Rs. 500 Staff: Nil Total Rs. 4,500	(iii) p. 199-201. The Board endorsed the recommendation of its Committee.
	(iv) X-ray Studies of Indian Clays by Dr. Sultana Z. Ali, Central Laboratories, Hydrabad. It was considered that the work should be done in consultation and collaboration with the G.S.I. and the C.G. & C.R.I. Equipment costing about Rs. 18,000 should be provided by the Central Laboratories themselves. Dr Atma Ram said that the work involved was important. He also looked upon it from the point of view of training of workers in specialised fields. The investigator-in-charge had training and experience in a well known laboratory abroad. At this stage one Research Assistant might be enough for the present. The Committee recommended the scheme with the following financial commitments, provided that the Central Laboratories would purchase the microphotometer stated to cost about Rs. 18,000. Equipment (Focussing camera). — Rs. 1,000 Contingencies ... Rs. 2,000 Staff (One Senior Scientific Asst. in the grade 250-500.) ... Rs. 4,080 (including allowances) Total Rs. 7,080 (including allowances) (This scheme has already been considered under Item No. VII page 13-15 of this agenda)	(iv) p. 201. The Committee noted that the scheme had already been considered under Item VII p. 13-15 of this agenda.	(iv) p. 201. The Board noted.

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*v*) Opaque Glasses : None of the Institutions addressed offered to conduct work on the scheme for Opaque Glasses. (*vi*) Origin of Base Exchange : Dr. Atma Ram was of the opinion that the work would require careful planning and he would take up the matter later. (*vii*) Mechanism of the Existence of Ferrous Iron in Phosphate Glasses : The Committee desired that Dr. Lahiri who wanted to work on the scheme might discuss it with Dr. Atma Ram. He informed the Committee that in view of the importance of the problem he had already put one Senior Scientific Assistant to work on it at the Institute and the work was already in progress.	(*v*), (*vi*) & (*vii*) p. 203. The Committee noted.	(*v*), (*vi*) & (*vii*) p. 203. The Board noted.
	5. ANY OTHER ITEM : (*a*) Mr. Chandorkar suggested that the next meeting of the Glass and Refractories Research Committee might be held at the C.G.C.R.I. so that the members could have an opportunity of seeing the work that was being done there. The Committee agreed. (*b*) Mr. Chandorkar further suggested that when members of the Committee visited the centres where schemes were in operation the investigators-in-charge might be informed of the visit so that they may discuss the progress of the scheme with them. He felt such discussion might be of benefit to the progress of the schemes. The Chairman welcomed the suggestion and desired that members should inform the Secretary C.S.I.R. about their visits so that he could inform the investigators about it.	5. (*a*) & (*b*) p. 203. The Committee endorsed the recommendations of the Research Committee.	5. (*a*) & (*b*) p. 203 The Board endorsed the recommendations (Research Committee.

Subject: **Proceedings of the Committee on Measurement of Geological Time in India:**
(*Chairman* : *Dr. D.N. Wadia*)

Synopsis:

1. A meeting of the Committee on the Measurement of Geological Time in India was held on the 14th January, 1953 in New Delhi.

In his opening remarks the Chairman, Dr. Wadia observed that the Committee had functioned since 1946, and the time had come for stock-taking of the work done. It was also necessary to acquaint the public with the work done by the Committee during this period.

The seven items suggested in the original memorandum for research were :—

(*i*) A systematic examination of the radioactive contents of minerals occurring in different rock-systems in India.

(*ii*) Similar examination of rock specimens obtained from well marked igneous, intrusive and traversing rocks of doubtful ages.

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	(*iii*) Uranium, thorium and radium contents of granites and gneisses. (*iv*) The correlation of the mica pegmatites of Gaya, Nellore and Mysore bearing minerals like uraninite, thorinite, torbernite, carnolite, allanite, gadolinite, samarskite, columbite. etc. (*v*) The determination of the much debated sequence of Archaean rocks in Chota Nagpur, Mysore and Central Provinces, the age of the Himalayan Central gneiss and the basic intrusive dykes. (*vi*) Age levels of different horizons of the Deccan Trap lava pile. (*vii*) Examination of radioactive contents of Indian minerals by (i) ionization electrometer, (ii) mass spectrograph, (iii) hyperfine structure methods, (iv) pleochroic haloes, (v) lead/uranium ratio, and (vi) helium ratio. A good deal of background work done so far had prepared the ground for the objective namely the actual dating of rock formations and rock bodies. Both B.S.I.R. and the Government were more concerned with this aspect. During the coming year it was necessary to orientate the line of approach to reach this objective and it should be possible to give definite results regarding the ages of (i) archaean and precambrian granites, (ii) gneisses of the basic intrusives of the peninsula, the Cuddapahs and Vindhyans and (iii) the determination of the different age levels of the Deccan Traps. The results would be of great interest to scientists in general and the geologists in particular. The Chairman then referred to the new research scheme on Palynology. He referred to the work carried out on Palaeobotany at Lucknow and said that although the results obtained had not been positive or encouraging, they were still useful and indicated that both microbiology and micropalaeobotany would be able to solve some of the problems of dating the rocks. However, everything was being done to achieve definite results. The study of pollen content and the ecology of sediments occurring in the various geological epochs would be of help in the researches in progress. 3. SCHEMES IN PROGRESS: (*i*) Determination of Uranium, Thorium and Radium Contents of Madras Granites by Prof C. Mahadevan, Waltair. Prof. Mahadevan reported: A study of the distribution of radio-activity in charnockites from Anantagiri (Visakhapatnam Dist.) Kondapalli (Krishna Dist.), Pallavaram near Madras and Trichonopoly in the South was done from two angles namely the variations in radio-activity with variations in mineral composition and regional variations in their radio-activity range. In the first study it was observed that in all the four areas radio-activity progressively decreased from acid to basic varieties.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
L. Committee for Measurement of Geological Time in India. 1. p. 203-205. The Committee noted with satisfaction the progress of research under the auspices of the M.G.T. Committee and endorsed the suggestions of the Chairman of the Research Committee as to the lines on which the future programme should be based.	**L. Committee for Measurement of Geological Time in India.** 1. p. 203-205. The Board noted and endorsed the suggestions of the Chairman of the Research Committee.

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	An attempt was also made to study the relationship between the garnet content and the radio-activity of charnockites and associated rocks. The indications so far were that the content is irrelatable to low radio-activity. An examination of the regional variation in the radio-activity in the charnockites was carried out. Under the direction of Prof. E.C. LaFond of Scripps Institution of Oceanography, California, U.S.A. oceanographic studies of the East Coast of India were carried out and samples of ocean bed were collected. The radio-activity determination of these samples carried out so far indicated relationship between depth of the ocean floor and the radio-activity of the sediments. This was in conformity with results obtained by Evans, Trask and Revelli. Investigation on the relationship between radio-activity and particle size and radio-activity and organic remains was in progress. Dr. M.S. Krishnan invited attention to a paper on charnockites by Dr. Naidu. It was for consideration whether they were of sedimentic or igneous origin. The acid charnockites appeared to be influenced by later magmatic activity but in the case of ultrabasic variety it was difficult to accept magmatic origin. The data obtained by Dr. Mahadevan correlated with other types of rocks might lead to some conclusions. (*ii*) Determination of Uranium, Thorium and Radium Contents of Madras Granites by Prof. R.S. Krishnan, Bangalore. Prof. Krishnan reported : The normal content of rock samples being very low a sensitive and precise method developed at Bangalore and involving use of direct fusion furnace of Evans in conjunction with the alpha counting method of Curtiss was adopted. With this method radium content of 27 rock samples from Kolar mines was measured. For determination of thorium content a method making use of a stream of methane gas which flushes out thoron at a constant rate through a proportional counter was developed. Twenty rock specimens were examined for their thorium contents by this method. The alpha activity of 20 specimens has also been accurately measured with a π counter specially designed for this purpose. This provides a check on previous measurements besides furnishing new data for age determination. In addition an apparatus for determination of helium by a chemical method was set up but work was held up due to liquid air supply not being available. Necessary spectro-chemical methods for determination of Rb/Sr ratio were being standardised and work on Nellore mica specimens was in progress.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*

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	It is intended to determine radium, thorium and total alpha activity of specimens from Kasara-Igatpuri areas received from Prof. Mahadevan. Helium determination and more accurate determination of Rb/Sr ratio spectrochemically, will also be carried out. Dr. R.S. Krishnan pointed out that X-ray technique was more reliable. (*iii*) Micropalaeobotanical Investigation for the Age Determination of Rocks by the Director, Birbal Sahni Institute of Palaeobotany, Lucknow. Dr. Hoeg reported : Messrs. Verma and Srivastava toured the Simla areas with the collaboration of G.S.I. team and obtained representative samples on which work was concentrated, using the new technique of 'acetolysis' by Faergi and Inersen. Wood fragments and spores were obtained from Infra Krol problematic rock. A paper on the results obtained was under preparation and would be submitted when the whole Simla series had been investigated. A paper on 'Microfossils and the Determination of Age of Sedimentary Rocks' had been published and another on Micro Remains from Upper Vindhyan Area was under publication. It is proposed to select the more promising problems from the programme of research laid down by Prof. Sahni. It may in particular be useful to search for coastal and littoral deposits with greater chances of inclusion of microfossils than deposits formed at greater distance from the shores. The areas selected for future include Simla, Spiti, Lower Gondwana of Himalayan rocks, Gondwana outliers, Gondwana and of the Coromandal coast and Pleistocene of Kashmir. It was pointed out that study of microfossils in Pleistocene of Kashmir would also be valuable. Dr. Wadia suggested that priority should be given to the older rock-systems. Dr. Hoeg said that work on Simla area would be first completed. (*iv*) Renewal : The Chairman remarked that considerable background work had already been done. However it was necessary to have an idea as to how long it was necessary to continue this work to arrive at some concrete results. He suggested that the present research schemes on the Determination of the Uranium Thorium and Radium Contents of the Granites etc., be terminated and in their places research, schemes under the title 'Age Determination of Certain Igneous and Metamorphic Rocks of Precambrian Era' be sanctioned. The Committee after discussion recommended that the schemes under Prof. Mahadevan and Dr. R.S. Krishnan and the one at the Birbal Sahni Institute of Palaeobotany Lucknow, be sanctioned for a period of three years under the new title.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
3 (*i*) (*ii*) (*iii*) & (*iv*) p. 205-209. The Committee noted with satisfaction the progress of work under the three Research Schemes for Measurement of Geological Time in India. The Committee recommended that the present Research Schemes be terminated and in their place the following new schemes be sanctioned with the grants indicated against each. **(*i*) Age Determination of certain Igneous and Metamorphic Rocks of the Precambrian Era.—to Dr. C. Mahadevan:** Equipment Rs. 2,500 Contingencies Rs. 1,500 Staff: Rs. 4,296 (including allowances) (1 J.R.A. & 1 Lab. Att:) Total Rs. 8,296 (including allowances) **(*ii*) to Dr. R.S. Krishnan:** Equipment Unspent balance. Contingencies Rs. 500 Staff: Rs. 4,118 (including allowances) (1 J.R.A. and 1 Lab. Att.) Total Rs. 4,618 (including allowances) **(*iii*) Paleobotanical Investigation—to Dr. Hoeg.** Equipment Nil Contingencies Rs. 2,000 Staff: Rs. 7,656/8/ (including allowances) (2 J.R.A's & 1 Lab. Att.) Total Rs. 9,656/8/ (including allowances)	3 (*i*) (*ii*) (*iii*) & (*iv*) p. 205-209 **The Board endorsed the recommendations of its Committee.**

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	4. NEW RESEARCH SCHEME ON 'PALYNOLOGY' BY DR. A. HOEG, DIRECTOR, BIRBAL SAHNI INSTITUTE OF PALAEOBOTANY, LUCKNOW. The Chairman informed the Committee on the report he had received from Dr. Hoeg that the President, Forest Research Institute, Dehra Dun, had not agreed to spare Dr. Puri on deputation to the Birbal Sahni Institute of Palaeobotany for this scheme. It was considered that the annual cost of deputation would be higher than training a scientist already working in the Institute for the purpose and keeping him on the work for about 3 years. The Committee thought that it would be worthwhile training such a scientist. The scheme itself was considered useful and was recommended for sanction with the following grant :— Equipment ... Rs. 4,500 Contingencies ... Rs. 3,000 Staff ... Rs. 7,020 (including allowances). (One Sr. Res. Asst. on Rs. 250-25-500, One Jr. Res. Asst. on Rs. 160-10-330), Total Rs. 14,520 (including allowances) (Details of this scheme were considered at the B.S.I.R. meeting held on the 12th August, 1952.)	4. p. 211. The Committee recommended that the Research ieme on Palynology by Dr. A. Hoeg be approved the following grant be made:— uipment Rs. 4,500 ntingencies Rs. 3,000 ff: Rs. 6,435 (including allowances) S.R.A 1 J.R.A.) Total Rs. 13,935 (including allowances)	4. p. 211. The Board endorsed the recommendation of its Committee.
	5. ANY OTHER BUSINESS : (i) The Chairman suggested that an article in popular language on the work done under the Committee may be prepared for publication. The three investigators working the schemes might collaborate and furnish the manuscript to the Chairman. (ii) Dr. M.S. Krishnan invited attention of the Chairman to the unsatifactory nature of the counters supplied to the Geological Survey of India by the Atomic Energy Commission. These counters ceased to work after use for a week or so, probably due to some constructional defect. The Chairman promised to look into the matter. (iii) At the suggestion of Dr. Mahadevan the Chairman also agreed to visit his laboratory to see the work in his scheme when he next paid a visit to Waltair.	5. (i) p. 211. The Committee endorsed the recommendation of ie Research Committee. (ii) p. 211. The Committee recommended that the matter be reported to the Atomic Energy Commission. (iii) p. 211. The Committee noted.	5 (i) p. 211. The Board endorsed the recommendation of the Research Committee. (ii) p. 211. The Board endorsed the recommendation of its Committee. (iii) p. 211. The Board noted.
LI	*Subject:* **Proceedings of the Leather Research Committee.** (*Chairman* : Mr. B. M. Das.) *Synopsis:* 1. A meeting of the Leather Research Committee was held jointly with the Local Planning Committee of the Central Leather Research Institute on the 16th January 1953 at Madras.	LI. Leather Research Committee. 1. p. 211. The Committee noted.	LI. Leather Research Committee. 1. p. 211. The Board noted.

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	2. RESEARCH SCHEMES: Reports of the following research schemes were considered and adopted:- (*i*) Studies on the Physio-chemical Properties of Hides Tanned and Untanned by Dr. B.N. Ghosh, Calcutta. (*ii*) Investigation of Mangrove Swamps of Sundarbans, specially Goran. (*iii*) Manufacture of Upholstry and Other Special Type of Leather. (*iv*) Microscopical Data and Standard Specifications for V.T. Sole Leather etc. by the Superintendent, Bengal Tanning Institute, Calcutta. 3. LONG TERM AND SHORT TERM PROGRAMME OF RESEARCH AT THE CENTRAL LEATHER RESEARCH INSTITUTE. The Chairman placed before the meeting the long term and short term programme of work he had prepared for consideration. There was discussion on some of the items in the programme. (*A*) *Short Term Programme* : (*i*) Curing of Hides and Skins with Didwana Salt by Dry and Wet Salting Processes. The Didwana salt which is a by-product is cheaper than edible common salt, and it will also be a source of income to the Government if this was used. The Salt Department had referred this problem. There were, however, complaints that the skins were spoiled. The problem requires some research. (*ii*) Adaptive Research on Tanning Processes to Improve the Quality of Some Kinds of Leather Manufactured in India. The Chairman informed the Committee that Chamois leather was produced from goat skins in India whereas it was made from sheep skin splits in Europe and America. Sheep skins, being of a looser texture than goat skins were better. Research will be taken up for the manufacture of Chamois leather from sheep skins specially those of South India. It was, however, felt that Chamois leather intended for filtering petrol was most suitable when made from goat-skins. (*iii*) Manufacture of Chrome Re-tan Leather for Ammunition Boots from Cow Hides by Combination of Chrome and Vegetable Tannages. The Committee was of the opinion that the process will be of value not only to the army but also for other kinds of cow hides for which pure chrome-tanning was not suitable. Mr. Fialka pointed out that vegetable re-tanning after chrome-tanning produced brittle in the grain. Mr. Fialka suggested the use of indigenous vegetable tanning materials for chrome re-tanning. After discussion, the Committee considered that development of chrome re-tan process from Indian

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
2. (*i*), (*ii*), (*iii*) & (*iv*) p. 213. The Committee recommended that the following research schemes be renewed with the grants noted against each. (*i*) **Physico-chemical properties of Hides—Dr. B.N. Ghosh.** Equipment Nil Contingencies Rs. 1,000 Staff: Rs. 3,190 (including allowances.) (1 J.R.A.) Total Rs. 4,190 (including allowances.) (*ii*) **Mangrove Swamps of Sundarbans—Mr. M. Banerji.** Equipment Nil Contingencies Rs. 500 Staff: Rs. 4,132 (including allowances) (1 J.R A. and 1 Lab. Att) Total Rs. 4,632 (including allowances) (*iii*) **Upholstry & Special Leather—Mr. M. Banerji.** Equipment Nil Contingencies Rs. 1,000 Staff: Rs. 3,110 (including allowances) (1 J.R.A.) Total Rs. 4,110 (including allowances) (*iv*) **Microscopical Data etc., for VT Sole Leather —Mr. M. Banerji.** Equipment Nil Contingencies Rs. 250 Staff: Rs. 3,110 (including allowances) (1 J.R.A.) Total Rs. 3,360 (including allowances)	2 (*i*), (*ii*), (*iii*) & (*iv*) p. 213. The Board endorsed the recommendations of its Committee.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	tanstuffs was an important piece of research. It was also suggested that research on synthetic resin finishes should be carried out at the Central Leather Research Institute. (*iv*) Fixation of Standard Specifications for Various Types of Leather. Mr. Fialka remarked that it was not actually a subject for research but for investigational analysis. He also suggested that samples of tanned kips produced in Northern India should also be analysed. The Director, Central Leather Research Institute agreed to do it. (*B*) *Long Term Programme* : (*i*) Research on Indian Vegetable Tanning Materials to find Out a Suitable Substitute for Imported Wattle Bark. Mr. A. Ayyangar suggested that investigation may be carried out on cross-breeding of different tanning plants such as avaram, wattle etc. The Committee recommended that experiments on the cultivation of various vegetable tanstuffs in the premises of the Institute may be taken up. He also recommended that researches should be carried out particularly on vegetable tanstuffs available in commercial quantities and that investigation on tanning properties of red-wood bark and teak-bark of Malabar may be taken up. (*ii*) Research on Tanstuffs in other Centres. It was recommended that the Central Leather Research Institute should carry out research on those aspects which had not been attended to by the Development Wing of the Government of India and the Development Wing may be requested to send all the data of their work to the Central Leather Research Institute to prevent over-lapping and securing co-ordination. (*iii*) Leather from Poor Hides of Dead Animals. The problem was of great importance to India. Even if cow-slaughter were not banned, India produced about 85% dead hides and only 15% of slaughtered hides. The Committee approved of the short term and long term programme of research as drawn up by the Chairman, Leather Research Committee with the above modifications.	3. p. 213-215. The Committee recommended that the long term and short term programme of research for the Central Leather Research Institute as drawn up by the Leather Research Committee be approved. The Committee also recommended that the Leather Research Committee be requested to indicate the problems that would be taken up in collaboration with the various Regional Tanning Institutes and the problems that could be taken up more appropriately at other centres of research such as the Forest Research Institute and the Regional Tanning Institutes. As regards the cultivation and cross-breeding of various tannin bearing plants in the premises of the Leather Research Institute the Committee was of the opinion that this should be more appropriately be taken up by the Forest Research Institute or under the auspices of the Indian Council of Agricultural Research.	3. p. 213-215. The Board endorsed the recommendations of its Committee.
4.	REPORT OF THE MADRAS GOVERNMENT'S COMMITTEE ON LEATHER AND LEATHER GOODS INDUSTRY. This Committee had made certain recommendations for research to be carried out at the Central Leather Research Institute. Development Secretary of the Govt. of Madras had sent a list of tanstuffs to Mr. B.M. Das and asked him to carry out research on those tanstuffs. The Committee generally agreed to the suggestion made by the Committee on Leather & Leather Goods Industry and recommended that this may be taken up for research at the Central Leather Research Institute.	4. p. 215. The Committee endorsed the recommendation of the Research Committee.	4 p. 215. The Board endorsed the recommendation of the Research Committee.

PROCEEDINGS OF THE STATISTICS, STANDARDS & QUALITY CONTROL COMMITTEE

Item No.	*Particulars.*
LII	**Proceedings of the Statistics, Standards & Quality Control Committee.** (*Chairman: Professor P.C. Mahalanobis, F.R.S.*). 1. A meeting of the Statistics, Standards and Quality Control Committee was held on the 11th October 1952 at New Delhi. Prof. Ellis R. Ott, Prof. Mason E. Wescott, Prof. Paul C. Clifford, Prof. Anders Hald and Mr. Thomas Budne, who constituted the team of experts from the United Nations Technical Assistance Administration for imparting quality control training in India, also attended the meeting by special invitation. Prof. Mahalanobis gave an account of the activities of the Committee and informed the visitors of the keenness of the CSIR to promote Statistical Quality Control in India. He also explained the arrangements for the SQC Training Project started by an agreement between the United Nations and the Government of India. 2. S.Q.C. TRAINING PROJECT : The Committee considered various remarks connected with the training project, which are summarised below. Arrangements have been made for holding four intensive training courses each of which was of about 3 weeks duration. 40 technicians selected from different industries and Government departments would attend each of these courses. Two batches of teacher-trainees would also attend at alternate centres. After the training the technicians would be in a position to make an immediate beginning of SQC work in their respective industries and the teacher-trainees would continue to work up future training after the close of the present programme. Members of the Committee were then invited to give their comments. (*a*) Dr. N.S.R. Sastri gave an account of his experience of the training course which was conducted by the Bombay Branch of the Indian Statistical Institute, partly financed by the CSIR. The first course meant mainly for spinning masters, weaving masters and foreman type of personnel was not quite satisfactory. On the basis of his experience in the United States the second part was organised with more numerical examples rather than mathematics in the instruction. He was however disappointed at the response from the management of industry. Lately this had improved owing to the informal talks of Mr. C.D. Deshmukh, Finance Minister, with the Bombay industrialists. Dr. Sastri suggested that the Bombay group may be given the opportunity of attending the U.N. training course at Bombay. Prof. Mahalanobis thought that perhaps in addition to the 40 seats a few more could be accommodated as observers. At the suggestion of Prof. Ott he also agreed that there should be at

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
LII. **Statistics, Standards & Quality Control Committee.** 1. p. 217. The Committee noted.	LII. **Statistics, Standards & Quality Control Committee.** 1 p. 217. The Board noted.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	least two from each industrial firm attending the training course as a single trainee might get lost when he got back to his plant. It was recommended that new vacancies should be filled in on this principle. (*b*) Mr. N.T. Mathew and Dr. Sukhatme suggested that some of the supervising staff should also attend the course. Mr. Clifford thought that if the manager type of personnel were serious they could have a few of them to attend the course. There was some difference of opinion regarding this and finally it was recommended that, if possible, serious top-management personnel might be given an opportunity to see the course in actual operation. Dr. Panth suggested that actual clinical cases might be arranged to impress the top management. Mr. Mathew pointed out that S.Q.C. methods could be applied with great advantage in munition factories, army workshops and inspection depots, and in the purchase of materials for the army. Practically no use was being made of inspection data in production. Since co-ordination between the two would be helpful, he suggested representatives of the two units to work together. Dr. Sukhatme informed the Committee that technicians normally did not like to do the chart work but wanted the statistical department to do that. (*c*) Dr. Moudgil stated that the Indian Standards Institution was proposing to issue certification marks and desired to know if S.Q.C. would be of help. He pointed out the difficulties of the I.S.I. in sampling commodities for purposes of grading. Prof. Mahalanobis suggested that specific problems should be sent to the Committee for study. (*d*) Prof. K B. Madhava was of the view that the stay of the U.N. experts was too short. 3. FOLLOW UP PROGRAMME: (*i*) Prof Mahalanobis thought that the most important work of the Committee would be the follow-up programme after the departure of the U.N. experts. He suggested the pooling up of Indian statisticians to carry on this work in future. It was recommended that another meeting of the Committee might be held either in Madras or in Bombay, at the end of the training course, to review the work of the training project and prepare a planned future programme of S.Q.C. work in India for consideration of the CSIR and the Planning Commission. (*ii*) Prof. Ott was of the opinion that the work should be carried out both inside and outside the industry. Inside the industry in would be inservice application and training; outside the industry it would be the organisation of courses and research in institutes and universities. A	2. p. 217-219. The Committee endorsed the recommendations of the Research Committee. The Committee noted that necessary action had been taken by the Chairman and the U.N. Team on the suggestions made by the members of the Statistics, Standards and Quality Control Committee during the S.Q.C. Training Project.	2 p. 217-219. The Board noted.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	central organisation should be there to secure effective co-ordination between the two and also handle the job of convincing top management about quality control. (*iii*) Mr. Budne on behalf of the United Nations assured the Committee that they would be interested in the follow-up programme and desired that he may be furnished with the material and literature regarding the work that had been done in India for communication to the U.N. Headquarters. (*iv*) Regarding approach to industrialists it was suggested that they may be invited to participate in the informal discussions and intensive talks at Calcutta, Bombay and Madras. Mr. Wescott was of the opinion that really top-management should be invited and Prof. Hald suggested that those industrialists should be invited whose concerns were sending the trainees. (*v*) The United Nations Experts agreed to the suggestion to use the S.Q.C. charts prepared by the I S.I. for their training courses. 4. RENEWAL OF THE GRANT FOR THE TRAINING COURSE AT BOMBAY : The Committee recommended that the training course should be continued and that the CSIR be requested to make a suitable grant.	3 p. 219-221. The Committee recommended that the S.Q.C. Committee be requested to review in detail the results of United Nations Training Project held in 1952 and to prepare a planned programme of work to follow up this project. 4. p. 221. The Committee recommended the continuance of the S.Q.C. Training scheme under the auspices of the Bombay Centre of the Indian Statistical Institute; a grant of Rs. 7500 was also recommended.	3. p. 219-221. The Board endorsed the recommendation of its Committee. 4. p. 221. The Board endorsed the recommendation of its Committee.
LIII	*Subject* : **Proceedings of the Board of Scientific & Industrial Research, Mysore.** 1. A meeting of the Board of Scientific & Industrial Research, Mysore, was held on the 17th March 1952 at Bangalore. 2. RECONSTITUTION OF THE BOARD : After a detailed discussion it was resolved that the Board of Scientific & Industrial Research, Mysore, should be enlarged so as to include about 45 members including top-ranking scientists, heads of technical departments, representatives of aided and private concerns in trade and commerce with the Chief Minister as its President and the Minister for Industry as its Deputy President. It was also resolved that there should be a permanent Technical Standing Committee with nine scientists in the State and six heads of Technical Departments and that there should be a small Executive Body or Committee with the Minister for Industry as its Chairman and two scientists and two heads of technical departments drawn from the Technical Standing Committee as its members. It was resolved that a Regional Research Laboratory should also be set up with necessary personnel and equipment located preferably in the industrial zone of Bangalore, near the Kempe Gowda tower. The expenditure would be met by Government with the aid of contributions from Government owned and Government aided concerns and private industrialists.	**LIII. Board of Scientific & Industrial Research Mysore.** 1. p. 221. The Committee noted. 2. p. 221. The Committee noted.	**LIII. Board of Scientific & Industrial Research Mysore.** 1. p. 221. The Board noted. 2. p. 221. The Board noted.

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	3. NICOTINE : At the instance of Professor C.V. Raman the Committee recommended that the problem be referred to the National Chemical Laboratory of India, who can take up the work.	3. p. 223. The Committee noted that research on nicotine had already been carried out in the National Chemical Laboratory, Poona, and recommended that the Mysore Board of Scientific & Industrial Research be informed about it.	3. p. 223. The Board noted and endorsed the recommendation of its Committee.
	4. EXPERIMENTS ON CLAY AT GOVERNMENT PORCELAIN FACTORY : Representative samples of clay were tested by M/s. Brown Boverie & Co., at Switzerland and by the Japanese Ceramic Consultant who visited the factory. The reports indicated that Thirthahally clay was suitable for dinner-ware and that Hebbur clay could be used up to 20% in electrical porcelain compositions. Prof. Raman desired to have for experimental purposes representative samples of these clays with copies of the above reports. The Director of Industries agreed. It was recommended that the clays may be subjected to the commercial tests for its suitability for manufacture of H.T. insulators. 5. CARDAMOM : M/s. Bush & Co., Ltd., had reported that the sample of oil did not come up to the B.P. Codex standards. It was recommended that the sample of the oil may also be got tested at Alipore Test House and by the Chief Conservator of Forests. Prof. Raman stated that it should be possible to improve the quality of the oil and bring it up to the approved standard. The Chief Marketing Officer was requested to pursue the matter in consultation with Prof. Raman.	4 & 5 p. 223. The Committee noted.	4 & 5 p. 223. The Board noted.
	6. UTILISATION OF TAMARIND SEEDS : The Chief Marketing Officer was requested to ascertain the details of the work done in Dehra Dun.	6. p. 223. The Committee recommended that the BSIR, Mysore be informed of the details of the proposed Research Scheme on Tamarind Seed Powder under Dr. Puri at Bombay.	6. p. 223. The Board endorsed the recommendation of its Committee.
	7. CEMENT ASBESTOS SHEETS : The Committee recommended that Mr. Buurman, delegate of Dutch Industries & Business, may be consulted regarding the use of chicken coop wire and other reinforcements in the manufacture of asbestos cement sheets. The Committee also recommended that Mr. Cassel of Nagpur and the Cement Marketing Company of India may be consulted regarding improvements in the process of manufacture of asbestos sheets and that experiments may be conducted at the Engineering College, Bangalore.	7. p. 223. The Committee noted that research work on cement asbestos sheets was also proposed to be taken up at the Central Building Research Institute and recommended that the Director, CBRI, be requested to contact the B.S.I.R., Mysore to obtain details of the work already carried out in Mysore.	7. p. 223. The Board noted and endorsed the recommendation of its Committee.
	8. DYE-STUFFS FROM SAW DUST : It was decided that the problem may be referred to the proposed Regional Research Laboratory.	8. p. 223. The Committee noted.	8. p. 223. The Board noted.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	9. SPIKE DISEASE : Although considerable amount of research had been done on this diesease, further intensiv investigations were considered necessary. Prof. C.V. Raman suggested that a highly specialise expert on virus diseases should be recruited for this purpose. The Board agreed with the sugges tion of Prof. Raman and requested the the Chief Conservator of Forests to take necessary action.	9. p. 225. The Committee noted.	9. p. 225. The Board noted.
	10. SUGAR-CANE WAX. Prof. Raman referred to an article in the Cane Sugar Handbook, 1945. The Board decide to obtain further particulars from the National Chemical Laboratory of India, Poona, whe some work has already been done in this connection.	10. p. 225. The Committee recommended that details of the work carried out in the National Chemical Laboratory, the Forest Research Institute and the Indian Institute of Sugar Technology, be made available to the Mysore Board.	10. p. 225. The Board endorsed the recommendation of its Committee.
LIV	*Subject:* **Writing off an amount of Rs. 411-4-3 being the cost of equipment rendered unse viceable or broken in the C.S.I.R. Research Schemes in the Bengal Engineerin College, Howrah.**	LIV. p. 225. The Committee recommended that the sum of Rs. 411/4/3 being the cost of the equipment rendered unserviceable under the CSIR Research Scheme at the Bengal Engineering College be written off.	LI The Board endorsed the recommendation of Committee.

Note:

The Principal, Bengal Engineering College, Howrah has informed that during 1951-52 the course of investigations in C.S.I.R. Research Schemes in his College, the items of equipme listed below were rendered unserviceable or broken.

Research Scheme	*Articles*	*Price*
(i) Gases in Steel	Gas washing bottles (five)	Rs. 47-1-9
	Quartz tubes (three)	Rs. 101-8-9
	Resistance (one)	Rs. 26-2-9
	U-tubes (four)	Rs. 31-6-6
(ii) Gas Turbine & Jet Propulsion Unit.	Stop-cock with glass joints (one)	Rs. 160-0-6
(iii) Study of Microseisms and Seawaves.	Plano-cylindrical lense (one) (15.2 cm. x 1.5 cm.)	Rs. 45-0-0
		Rs. 411-4-3

The Accountant General, West Bengal in his audit report has desired that approval of t Council may be taken to write off the value of these articles. The Principal, Bengal Engineeri College has explained the circumstances under which these articles were damaged.

RENEWAL OF GRANTS

Item No. LV.

Subject : **Renewal of Grants sanctioned for the Chairmen of the Research Committees for the year 1953-54.**

Synopsis :

Chairmen of the various Research Committees of the Board of Scientific & Industrial Research, have asked for the following grants for the year 1953-54:—

S. No.	Committee	Contingencies	STAFF		Total
			Particulars	Amount	
1	2	3	4	5	6
1.	Chemical Research Committe.	(i) Contingencies 300 (ii) Furniture 500	1 Part-time Scientific Asst. on Rs. 40 p.m. 1 Part-time Stenographer on Rs. 50 p.m. 1 Part-time Peon on Rs. 10 p.m.	1,200	2,000
2.	Pharmaceuticals and Drugs Research Committee.	300	1 Clerk-cum-typist in the scale of Rs. 55-3-85-EB-4-125-5-130 plus allowances.	1,440	1,740
3.	Physical Research Committee.	300	1 Steno-typist in the scale of Rs. 55-3-85-EB-4-125-5-130 plus allowances plus Rs. 20 special pay.	1,776	2,076
4.	Glass & Refractories Research Committee.	500	1 Assistant Secretary in the scale Rs. 160-10-330 plus allowances. 1 Steno-typist in the scale of Rs. 55-3-85-EB-4-125-5-130 plus allowances plus Rs. 20 special pay.	5,115	5,615
5.	Biochemical Research Committee.	300	1 Assistant Secretary in the scale Rs. 250-25-500 plus allowances. 1 Stenographer in the scale of Rs. 160-10-330 plus allowances.	9,230	9,530
6.	Plastics Research Committee.	(i) Contingencies 400 (ii) Furniture 455	1 Scientific Assistant in the scale Rs. 250-25-500 plus allowances. 1 part-time Stenographer on an allowance of 20% of his pay.	5,345	6,20
7.	Vegetable Oils Research Committee.	300	1 Scientific Asst. in the scale of Rs. 160-10-330. 1 Part-time Typist on Rs. 20 p.m. 1 Part-time Clerk on Rs. 10 p.m.	4,043	4,34
8.	Metals Research Committee.	300	1 Stenographer in the scale of Rs. 80-5-120-EB-8-200-10-220 plus allowances. Contribution to M/s. Tata Iron & Steel Co., Ltd., Jamshedpur towards honorarium Rs. 400 p.m.	6,932	7,23

Recommendations of the Committee of the Board.	Recommendations of the Board.

RENEWAL OF GRANTS.

S. No.	Committee	Contingencies	STAFF Particulars	STAFF Amount	Total
1	2	3	4	4	5
9.	Radio Research Committee.	300	1 Secretary in the scale Rs. 160-10-330 plus allowances. 1 Stenographer in the scale of Rs. 160-10-330 plus allowances.	6,080	6,38[illegible]
10.	Internal Combustion Engines Research Committee.	300	1 Secretary in the scale of Rs. 250-25-500 plus allowances. 1 Stenographer in the scale of Rs. 160-10-330 plus allowances.	6,420	6,720
11.	Fuel Research Committee.	300	1 Assistant in the scale of Rs. 160-10-300-EB-15-450 plus allowances.	5,261	5,561
12.	Essential Oils Research Committee.	300	1 Steno-typist in the scale of Rs. 55-3-85-EB-4-125-5-130 plus allowances plus Rs. 20 special pay.	1,644	1,944
13.	Cellulose Research Committee.	300	1 Steno-typist in the scale of Rs. 55-3-85-EB-4-125-5-130 plus allowances plus Rs. 20 special pay.	1,568	1,868
14.	Atmospheric Research Committee.	300	1 Part-time Stenographer on an allowance of 20% of his pay.	532	832
15.	Leather Research Committee.	100	1 Scientific Asst. in the scale of Rs. 160-10-330 plus allowances.	3,192	3,292
16.	Committee on the Measurement of Geological Time in India.	300	1 Part-time Stenographer on an allowance of 20% of his pay.	540	840
17.	Salt Research Committee.	300	1 Scientific Asstt. in the scale of Rs. 250-25-500 plus allowances. 1 Steno-typist in the scale of Rs. 55-3-85-EB-4-125-5-130 plus allowances plus Rs. 20 special pay. 1 Part-time clerk on Rs. 30 p.m.	7,471	7,771

Recommendations of the Committee of the Board.	Recommendations of the Board.
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	LV. p. 227-229. The Board endorsed the recommendations of its Committee.

RENEWAL OF GRANTS

Item No. LVI

Subject : **Applications for Renewal of Grants-in-aid for Schemes of Research, for the year 1953-54.**

Synopsis :

Applications for the renewal of grants, for the year 1953-54, have been received in respect of the following schemes of research, in operation in the various Laboratories of the country. The titles of the schemes and the amounts of grants asked for are given below :—

S.No.	Scheme.	Amount spent upto 29th Feb. 1952.	Amount sanctioned for 1952-53	GRANT REQUESTED FOR 1953-54			
				Equipment.	Contingencies.	Staff.	Total.
	(A) PHYSICAL RESEARCH COMMITTEE.						
1.	Study of molecular spectra in visible and ultraviolet regions by Dr. K. Majumdar, Allahabad	Nil	2,310	Nil	500	3,180	3,680
2.	Design and development of certain electrical measuring instruments by Shri N.M. Athavale, Poona.	5,603	8,872	5,850	2,600	2,878	11,328
3.	Investigations on molecular spectra by Dr. R.K. Asundi, Banaras.	11,080	7,665	Nil.	2,000	6,910	8,910
4.	Spectral studies of the heterocyclic aromatic compounds by Dr. M.R. Padhye, Bombay.	Nil.	2,270	Nil.	2,000	6,120	8,120
5.	Production of synthetic sapphires under altered title of Production of single crystals of alumina and other refractory materials by Dr. P.K. Kichlu, Delhi.	13,574	5,109	2,000	1,000	6,298	9,298
	(B) RADIO RESEARCH COMMITTEE.						
1.	Study of scattering of radio waves, by Dr. S.S. Banerjee, Banaras.	Nil.	3,848	Nil.	1,000	2,968	3,968
2.	Polarisation of downcoming radio waves by Dr. S.R. Khastgir, Banaras.	21,570	4,290	Nil.	600	3,798	4,398

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
LVI. p. 231. The Committee noted that in the Budget Estimates for the year 1953-54 a sum of Rs. 12.5 lakhs had been allocated for grants-in-aid. The demands were as follows and in excess of funds available. Renewal applications so far received and included in the agenda for consideration. 12.24 lakhs Renewal applications which may be received late. 1 lakh New schemes under consideration before the Board. 8 lakhs Provision for schemes that might be received during the year. 1.5. lakhs Total 22.74 lakhs The Committee carefully scrutinised the renewal applications and recommended the grants as shown below; (A) PHYSICAL RESEARCH COMMITTEE. The Committee noted that the schemes has already been considered under item XXXVII pages 95-99 of this agenda.	

RENEWAL OF GRANTS

S.No.	Scheme.	Amount spent upto 29th Feb. 1952.	Amount sanctioned for 1952-53.	GRANT REQUESTED FOR 1953-54			
				Equipment.	Contingencies.	Staff.	Total.
3.	Study of the nature of atmospherics by Dr. S.R. Khastgir, Banaras.	9,469	3,877	1,500	500	3,420	5,420
4.	Investigations on radio valves, by Dr. S.K. Mitra, Calcutta.	91,498	13,929	1,000	1,000	11,376	13,376
5.	Ionospheric investigations by Dr. S.K. Mitra, Calcutta.	1,24,188	31,080	8,000	1,000	32,557	41,557
6.	Recording and analysis of reflections of electromagnetic waves from ionosphere at Ahmedabad by Dr. K. R. Ramanathan, Ahmedabad.	2,326	12,066	2,500	5,000	8,052	15,552
7.	Investigation on R-C coupled F.M, Oscillator by Dr. H. Rakshit, Calcutta.	6,746	3,696	Nil.	250	1,650	1,900
8.	Absorption of microwaves in 3 cm. region by Mr. Krishnaji, Allahabad.	744	5,164	Nil.	1,200	4,224	5,424
	(C) ATMOSPHERIC RESEARCH COMMITTEE.						
1.	Study of microseisms and seawaves and thir correlation with cyclonic disturbances by Dr. S.K. Chakravarty, Calcutta.	6,005	5,495	Nil.	2,400	4,700	7,100
2.	Atmospheric ozone and weather by Dr. K.R. Ramanathan, Ahmedabad.	9,032	18,054 plus unspent balance under equipment during the year 1951-52 (4,675)	Unspent balance.	5,000	11,595	16,595 plus unspent balance of equipment grant.
3.	Infra-red radiation from the atmosphere and solar radiation by Dr. L.A. Ramdas, Poona.	9,344	1,0510 plus unspent balance from 51-52 under equipment.	Unspent balance. of 5,000	4,000	8,455	12,455 plus unspent balance of Rs.5000

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
p. 231-233. (B) RADIO RESEARCH COMMITTEE. The Committee noted that these schemes would be considered under Item LXVI pages 285-289 of this agenda.	
(C) ATMOSPHERIC RESEARCH COMMITTEE. The Committee noted that these schemes would be considered under Item LXV pages 271-273 of this agenda.	

RENEWALS OF GRANTS.

S. No.	Scheme.	Amount spent upto 29th Feb. 1952.	Amount sanctioned for 1952-53.	GRANT REQUESTED FOR 1953-54. Equipment.	Contingencies.	Staff.	Total.	Recommendations of the Committee of the Board.	Recommendations of the Board.
	(D) COMMITTEE ON THE MEASUREMENT OF GEOLOGICAL TIME IN INDIA.								
1.	Determination of uranium, radium and thorium contents of Madras granites etc., by Dr. R.S. Krishnan, Bangalore.	35,623	5,492	Unspent balance of grant of 1952-53	500	4,108	4,608 plus unspent equip. grant of 1952-53.		
2.	Determination of uranium, radium, and thorium contents of Madras granites etc. by Dr. C. Mahadevan, Waltair.	40,660	15,010	2,500	2,500	6,571	11,571		
3.	Palaeobotanical investigations for the age determination of rocks, by the Director, Birbal Sahni Inst. of Palaeobotany, Lucknow.	62,134	9,713	3,000	3,000	7,657	13,657	p. 235. (D) MEASUREMENT OF GEOLOGICAL TIME COMMITTEE. The Committee noted that these schemes had already been considered under Item L (3) pages 203-209 of this agenda.	
	(E) STATISTICS, STANDARDS AND QUALITY CONTROL COMMITTEE.								
1.	Scheme for training and research in statistical methods in quality control by the Chairman, Board of Management for Quality Control, Indian Statistical Institute, Bombay.	15,282	5,000	1,800	1,315	7,740	10,855	(E) STATISTICS, STANDARDS AND QUALITY CONTROL COMMITTEE. The Committee noted that the scheme had already been considered under Item 4 p. 221.	
	(F) INTERNAL COMBUSTION ENGINES RESEARCH COMMITTEE.								
1.	Development of gas turbine and jet propulsion units by Dr. S R. Sengupta, Calcutta.	16,627	23,767	Nil.	20,000	18,975	38,975		
2.	Development of flash steam generator by Mr. R.K. Mukherjee, Uttarpara.	2,299	5,800	5,000	7,000	3,000	15,000		
3.	Electropolishing of bearing surfaces in relation to mechanical and internal combustion engines by Prof M S. Thacker, and Dr. Brahm Prakash, Bangalore.	Nil.	6,404	Unspent balance.	2,000	7,260	9,260 plus unspent balance		

RENEWALS

S.No.	Scheme.	Amount spent upto 29th Feb. 1952.	Amount sanctioned for 1952-53.	GRANT REQUESTED FOR 1953-54. Equipment.	Contingencies.	Staff.	Total.	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
4.	Development of heavy duty parts of internal combustion engines by Prof. M.S. Thacker, Banglore.	Nil.	10,656	15,000	7,000	16,834	38,834		
5.	Hot air engines and their development by Dr. H A. Havemann, Bangalore.	10,033	17,929	5,000 plus unspent balance.	1,000	7,475	13,475 plus unspent balance.		
6.	Design and development of an air-cooled aero otto engine by Prof. H.A Havemann & Dr. V.M. Ghatage, Bangalore.	Nil.	2,071	50,000	12,000	33,204	95,204	p. 235-237. (F) INTERNAL COMBUSTION ENGINES RESEARCH COMMITTEE. The Committee noted that these schemes had already been considered under Item XLVI pages 171-173 of this agenda.	
	(G) CHEMICAL RESEARCH COMMITTEE.								
1.	Anthraquinonoid and sulphurised vat dyes by Dr. K. Venkataraman, Bombay.	30,362	17,050	Nil.	4,800	14,020	18,820		
2.	Electrolytic oxidation of organic compounds by Dr. B.B. Dey, Madras.	6,970	7,890	1,000	1,000	6,186	8,186		
3.	Pilot plant preparation of ether and ethylene dichloride from alcohol by the Director, Sri Ram Inst. of Industrial Research, Delhi.	Nil.	Nil.	50,000	Nil.	6,120	56,120		
4.	Halogenation of organic compounds under electric discharge, by Dr. S.S. Joshi, Banaras.	Nil.	Nil.	Nil.	500	2,640	3,140	(G) CHEMICAL RESEARCH COMMITTEE. The Committee noted that these schemes had already been considered under Item XXXVIII pages 99-103 of this agenda.	
	(H) PHARMACEUTICALS AND DRUGS RESEARCH COMMITTEE.								
1.	Preparation of cortisone and corticosterone analogues by Dr. Dilip K. Banerjee, College of Engineering & Technology, Calcutta.	3,667	4,170	Nil.	2,000	3,290	5,290		
2.	Chloramphenicol (chloromycetin analogues and derivatives by Dr. B.D. Tilak, Bombay.	2,987	3,898	Nil.	750	3,268	4,018		

No.	Scheme.	Amount spent upto 2[illegible]th Feb. 1952.	Amount sanctioned for 1952-53.	GRANT REQUESTED FOR 1953-54. Equipment.	Contingencies.	Staff.	Total.	Recommendations of the Committee of the Board.	Recommendations of the Board.
3.	Biological studies on malarial parasites by Dr. U.P. Basu, Calcutta.	2,252	5,166	Nil.	500	4,892	5,392		
4.	Biological studies on malarial parasites by Dr. R.N. Chaudhuri, School of Tropical Medicine, Calcutta.	4,348	6,918	500	750	6,562	7,812		
5.	Preparation of 8-aminoquinoline derivatives as possible antimalarials by Dr. U.P. Basu, Calcutta.	28,501	11,611	Nil.	1,000	14,734	15,734		
6.	Chemical investigation of Indian cardiac drugs by Prof. S. Rangaswami, Waltair.	Nil.	5,010	Nil.	2,000	3,835	5,835		
7.	Chemical investigation of Indian Lichens, by Dr. T.R. Seshadri, Delhi.	8,831	9,492	Nil.	2,500	7,473	9,973		
8.	Synthesis of kellin, its isomers etc., by Dr. T.R. Seshadri, Delhi.	7,132	4,370	Nil.	1,000	3,420	4,420		
9.	Synthesis of new types of insecticides, by Dr. T.R. Seshadri, Delhi.	9,105	4,670	Nil.	1,500	3,600	5,100		
10.	Survey of fungus flora of India in search of antibiotics, by Prof. S.R. Bose, Calcutta.	52,895	21,543	6,500	10,122	23,060	39,682		
11.	Compilation of a brochure on the indigenous drugs of India by the Director, Central Drug Research Inst., Lucknow.	14,099	6,345	Nil.	500	6,478	6,978		
12.	Biological assaying of insecticides by Col. Jaswant Singh, Malaria Inst. of India, Delhi.	Nil.	13,00	Nil.	2,500	9,400	11,900		
13.	Screening of antimalarial drugs by Col. Jaswant Singh, Malaria Inst. of India, Delhi.	Nil.	14,820	6,000	7,000	10,600	23,600		
14.	Preparation of polyvaccine for typhoid, cholera and dysentry by Dr. S P. Gupta, Lucknow.	Nil.	18,852	Unspent balance.	3,000	12,905	15,905 plus unspent balance under Equipment.		

S.No.	Scheme.	Amount spent upto 29th Feb. 1952.	Amount sanctioned for 1953-1954	GRANT REQUESTED FOR 1953-54. Equipment.	Contingencies.	Staff.	Total.	Recommendations of the Committee of the Board.	Recommendations of the Board.
15.	Microbiological Research Scheme by Col.S.S. Bhatnagar, Bombay.	Nil.	24,643	7,500	5,000	12,489	24,989		
16.	Antibiotic Research Scheme by Col. S.S. Bhatnagar, Bombay.	1,07,799	23,065	5,000	4,000	13,355	22 355		
17.	Chemical and pharmacological investigations on some reputed cardiac and uterine drugs by Dr. B.N. Ghosh, Calcutta.	5,434	13,038	Nil.	1,500	12,455	13,955	p. 237-241. (H) PHARMACEUTICALS AND DRUGS RESEARCH COMMITTEE. The Committee noted that these schemes had already been considered under Item XXXIX and XL pages 111-121 of this agenda.	
18.	Survey of medicinal and economic plants of Ladakh by Col. R.N. Chopra, Jammu-Tawi.	Nil.	1,000	Nil.	400	600	1,000		
	(J) BIOCHEMICAL RESEARCH COMMITTEE.								
1.	Processing conditions for the preservation of Indian vegetables by heat treatment (canning) by Dr. A.N Bose, Calcutta.	3,210	3,910	Nil.	1,000	3,300	4,300		
2.	Nutritive value of canned foodstuffs in India by Dr. N.G. Magar, Bombay.	2,388	3,467	Nil.	360	3,227	3,587		
3.	Cytogenetics of yeasts and fungi by Dr. M.K. Subramanian, Bangalore.	67,581	12,448	Nil.	2,500	11,664	14,164		
4.	Proteins from green leaves by Dr. B.C. Guha, Calcutta.	12,823	6,884	1,000	2,000	6,338	9,338	(J) BIOCHEMICAL RESEARCH COMMITTEE. The Committee noted that these schemes had already been considered under Item XLI pages 129-133 of this agenda.	
5.	Thyroidal activity of thyroglobulin and other iodoproteins by Dr. P.S. Sarma, Madras.	3,615	5,714	Nil.	2,000	8,462	10,462		
	(K) FUEL RESEARCH COMMITTEE.								
1.	Coal blending and coking research by Messrs. Tata Iron & Steel Co., Ltd., Jamshedpur & Council of Scientific & Industrial Research.	2,80,971	35,561	Nil.	10,000 (50% of 20,000)	28,500 (50% of 57,000)	38,500 (50% of 77,000)		

S.No.	Scheme.	Amount spent upto 29th Feb. 1952.	Amount sanctioned for 1952-53.	GRANT REQUESTED FOR 1953-54			
				Equipment.	Contingencies.	Staff.	Total.
2.	Palaeobotanical investigation of Indian coals by Dr. K.R. Surange, Lucknow.	5,118	9,647	2,350	2,500	10,420	15,270
3.	Pilot plant investigation on briquetting of non-coking Indian coals, by the Director Central Labs., for Scientific and Industrial Research, Hydrabad (Deccan).	Nil.	6,450	5,000	2,000	6,042	13,042
4.	Mechanism of explosions by Dr. N.R. Tawde, Bombay.	13,243	8,456	750	1,300	7,496	9,546
	(L) ESSENTIAL OILS RESEARCH COMMITTEE.						
1.	Cultural experiments on Patchouli by Shri B.S. Nirody, Bangalore.	141	7,046	Nil.	1,150	6,360	7,510
2.	Rose investigation scheme by Dr. K. Biswas, Calcutta.	4,576	8,772	450	2,500	6,800	9,750
	(M) VEGETABLE OILS COMMITTEE.						
1.	Modification of Mowrah oil by Dr. J.G. Kane, Bombay.	Nil.	4,590	Nil.	1,200	3,180	4,380
	(N) VANASPATI RESEARCH ADVISORY COMMITTEE.						
1.	Studies on iso-oleic acids from vanaspati by Dr. V.N. Patwardhan, Coonoor.	25,033	7,885	Nil.	2.000	6,437	8,437
2.	Stability of crude, refined, and hydrogenatrd oils etc. by Dr. B.C, Guha, Calcutta.	24,659	7,370	Nil.	2,000	6,030	8,030
3.	Utilisation and processing of cotton seed oil for edible purposes by the Director, C.F.T.R.I., Mysore.	31,954	8,272	Nil.	2,000	5,700	7,700
4.	Literature survey of oils and fats by the Director, C.F.T.R.I., Mysore.	Nil.	5,691	Nil.	600	6,420	7,020

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
p. 241-243. (K) FUEL RESEARCH COMMITTEE. The Committee noted that these schemes had lready been considered under Item XLIV 5. p. 163 f this agenda.	
(L) ESSENTIAL OILS RESEARCH COMMITTEE. The Committee noted that these schemes had lready been considered under Item XLII 4. p. 45-149 of this agenda.	
(M) VEGETABLE OILS RESEARCH COMMITTEE. The Committee noted that these schemes had already been considered under Item 4. p. 159 of this agenda.	
(N) VANASPATI RESEARCH ADVISORY COMMITTEE. The Committee recommended the following grants:—	

	Equip.	*Cont.*	*Staff.*	*Total*
1.	Nil	2000	6197 (1 SRA & 1 Lab. Att.)	8197 (including allowances)
2.	Nil	2000	5700 (1 SRA)	7700 (including allowances)
3.	Nil	2000	5360 (1 SRA & 1 JLA).	7360 (including allowances)
4.	Nil	250	6264 (1 SRA & 1 Steno).	6514 (including allowances)

S.No.	Scheme.	Amount spent upto 29th Feb. 1952.	Amount sanctioned for 1952-53	GRANT REQUESTED FOR 1953-54			Total.
				Equipment.	Contingencies.	Staff.	
	(O) METALS RESEARCH COMMITTEE						
1.	Investigation on making of briquettes for charging in low shaft furnace by Dr. Jagat Ram, TISCO, Jamshedpur.	Nil.	Nil	unspsent balance from last year	150	1,968	2,118 plus unspent balance.
2.	Binary and ternary alloy syatem with titanium as one of the alloying constituents by Dr. G.P. Chatterjee and Dr. B. Chatterjee, Calcutta.	279	3,980	Nil.	1,000	3,450	4,450
3.	Corrosion of metals and alloys with special reference to the effect of titanium by Dr. G.P. Chatterjee and Dr. B. Chatterjee, Calcutta.	183	3,830	Nil.	1,000	3,180	4,180
4.	Mineragraphic study of magnetite ores by Prof. N.N. Chatterjee, Calcutta.	295	4,290	1,500	500	3,660	5,660
5.	Preparation and properties of high purity titanium metal by Dr. D. Swarup & Prof. S. Ramamurthy, Banaras.	Nil.	4,780	1,000	1,000	4,065	6,065
6.	Pilot plant experiments in modified aluminothermic reduction of titanium and other refractory oxides by Dr. D. Swarup and Prof. S. Ramamurthy, Banaras.	Nil.	4,410	Nil.	1,075 plus amount already sanctioned.	1,381 plus amount already sanctioned.	2,456 plus amount already sanctioned upto 26.9.53.
7.	Gases in steel by Dr. G.P. Chatterjee, Calcutta.	10,359	7,890	Nil.	2,000	8,205	10,205
8.	Production of aluminium metal by the electrolysis of molten anhydrous aluminium chloride by Dr. E.G. Ramachandran, Bangalore.	5,202	6,103	Nil.	1,000	5,368	6,368
9.	Electro-refining and recovery of copper from copper scrap by Mr. G.C. Mitter, Bombay.	3,015	5,420	1,000	1,000	3,360	5,360

...mmendations of the Committee of the Board.	Recommendations of the Board.

S.No.	Scheme.	Amount spent upto 29th Feb. 1952.	Amount sanctioned for 1952-53.	GRANT REQUESTED FOR 1953-54. Equipment.	Contingencies.	Staff.	Total.
10.	Investigation on aluminium coating of steel by Dr. Brahm Prakash, Bangalore.	Nil.	5,210	Unspent balance.	1,000	4,530	5,530
11.	Production methods and properties of low carbon alloyed steels etc. by Dr. H. Schrader, Jamshedpur-	9700	Nil.	Nil.	Unspent balance	Nil.	Unspent balance from last year
	(P) PLASTICS RESEACH COMMITTEE.						
1.	Construction of osmometers suitable for high polymer research by Dr. S.R. Palit, Calcutta.	11,908	8,311	Nil.	250	4,300	4,550
2.	Construction of light scattering apparatus for the measurement of molecular weight, size and shape of high polymers by Dr. S.R. Palit, Calcutta.	452	3,360	1,000	1,500	5,836	8,336
3.	Studies on the thermodynamic properties of high polymer solutions by Dr. S.R. Palit, Calcutta.	Nil.	2,530	2,500	1,000	3,660	7,160
	(Q) CELLULOSE RESEARCH COMMITTEE.						
1.	Anatomical studies of cellulosic raw materials by Dr. K.A. Chowdhury, and Dr. R.V. Bhat, Debra Dun.	13,175	9,104	Nil.	1,000	8,025	9,025
	(R) LEATHER RESEARCH COMMITTEE.						
1.	Physico-chemical properties of hides tanned and untanned by Dr. B N. Ghosh, Calcutta University.	1,760	3,830	500	1,000	4,778	6,278
2.	Manufacture of upholstery and other special types of leather by Mr. M. Banerjee, Calcutta.	Nil.	2,530	Nil.	2,000	3,110	5,110
3.	Microscopical data and standard specification for vegetable tanned sole leather by Mr. M. Banerjee, Calcutta.	Nil.	4,480	Nil.	500	3,110	3,610

Recommendations of the Committee of the Board.	*Recommendations of the*
p. 245-247. (O) METALS RESEARCH COMMITTEE. The Committee noted that these schemes had already been considered under Item XLVII 3. pages 181-185 of this agenda.	
p. 247. (P) PLASTICS RESEARCH COMMITTEE.	

	Equip.	*Cont.*	*Staff.*	*Total*
1.	Nil	250	4279 (1 JRA & 1 Lab. Att.)	4529 (including allowances)
2.	1000	500	1602 (1 Mechanic)	3102 (including allowances)
3.	Nil	1000	3625 (1 JRA)	4625 (including allowances)
	(Q) CELLULOSE RESEARCH COMMITTEE.			
1.	Nil	1000	8714 (1 SRA & 1 JRA)	9714 (including allowances)

.No.	Scheme.	Amount spent upto 29th Feb. 1952.	Amount sanctioned for 1952-53.	GRANT REQUESTED FOR 1953-54			
				Equipment.	Contingencies.	Staff.	Total.
4·	Investigation and study of the characteristic behaviour of Sunderban mangroves especially goran by Mr.M. Banerjee, Calcutta.	Nil.	4,540	1,500	1,000	4,130	6,630
			(S) MISCELLANEOUS.				
1.	Flora of Delhi State by Dr. P. Maheshwari, Delhi University.	Nil.	Nil.	Nil.	1,000	3,420	4,420

Items received late are included in the Supplementary Agenda.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
p. 247-249. (R) LEATHER RESEARCH COMMITTEE. The Committee noted that these schemes had already been considered under Item 2 p. 213 of this agenda.	
(S) MISCELLANEOUS. Flora of Delhi State—Dr. Maheshwari. The Committee noted that the scheme had not started yet. The Committee recommended regrant of funds already sanctioned during 1952-53.	LVI. p. 231-249. The Board noted and endorsed the recommendations of its Committee.

SUPPLEMENTARY PROCEEDINGS

OF THE 30th MEETING OF THE

BOARD OF SCIENTIFIC & INDUSTRIAL RESEARCH

MARCH 10, 1953.

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'E ITEMS—RESEARCH SCHEMES

em No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
LVII	*Subject* : **Some Aspects of Oceanographic Research by Prof. C. Mahadevan, Head of the Department of Geology, Andhra University, Waltair.** *Scope* : Prof. Mahadevan has carried out a number of cruises on the Eastern Coast of India in collaboration with Prof. E.C. LaFond of the Scripp's Institute of Oceanography, California on vessels supplied by the Indian Navy. A wealth of data has been collected from over two hundred stations pertaining to Bathy-thermographic measurements, visibility, salinity distribution, core and snapper samples. The data collected will be of importance for naval defence and mercantile shipping. It will also provide valuable information on sedimentological aspects of ocean bottom sediments. Some radiolarian oozes are radioactive enough to be amenable to economic extraction. Clays and diatomaceous oozes are also industrial materials. The studies will give a clear idea of temperature depth relationships, the nature and disposition of cold and hot water currents and their seasonal variations, visibility, distribution of salinity. The information is of vital importance to the navy and mercantile shipping. *Collaboration* : The work will be done under the general direction of Prof LaFond. Dr. P.N. Ganapathi, Head of the Department of Zoology will collaborate on biological aspects. With the existing personnel available at the Andhra University it is not possible to cope with the data. *Duration* : The scheme is to be worked for one year in the first instance. *Grant asked for* : Equipment ... Rs. 1,200 (One deep and one shallow battery thermograph, one dredger). Contingencies ... Rs. 1,500 Staff ... Rs. 3,600 (including allowances). (Two Senior Lab. Assts. on Rs. 100-200). Total Rs. 6,300 (including allowances). *Research Committee's recommendation* : The scheme has been referred to the Committee for Measurement of Geological Time in India and the Physical Research Committee for opinion.	LVII. p. 253. The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the opinion of the Research Committee.	LVII. p 253. The Board endorsed the recommendation of its Committee.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
LVIII	*Subject* : **Electron-diffraction Studies of Semi-conductor Rectifiers and Developement of Copper Oxide Triode by Prof. K. R. Dixit, Head of the Physics Department, Institute of Science, Bombay.** *Object* : The aims of the scheme are :— (*i*) to determine experimentally the thickness of the barrier layer in the copper oxide rectifiers, and to study the nature of this layer by electron diffraction, and (*ii*) with this knowledge to construct a copper oxide triode. *Scope* : Work on rectifiers has been carried out in U.K. and U.S.A., but details are not available. Bardeen and Brattain have developed germanium triode in which contacts are made by pointed wire, hence power-out-put is low. *Author's record* : Prof. Dixit has observed that rectification is improved about five times by introducing foreign substances in mother copper. An electron-diffraction camera, high vacuum metal evaporation apparatus and vacuum furnace have been built up in Dr. Dixit's Laboratory, and preliminary work has been completed. A few rectifiers prepared showed rectification as high as 40. *Duration* : The first part of the scheme which will be taken up now is expected to go for 2 years. *Grant asked for* : Equipment ... Rs. Nil. Contingencies ... Rs. 750 (Nickel, molybdenum, german-silver discs etc.). Staff ... Rs 4,230 (including allowances) (One Senior Res. Asst. with experience of work, preferably Ph.D.). Total Rs. 4,980 (including allowances) *Research Committee's recommendation* : The scheme has been referred to the Physical Research Committee and the Radio Research Committee for opinion.	LVIII p. 255. The Committee noted that the scheme had been referred to the Physical Research and the Radio Research Committees for opinion. It was recommended that the scheme be placed before the Board at their next meeting.	LVIII p. 255. The Board noted and endorsed the recommendation of its Committee.

LATE ITEMS—RESEARCH SCHEMES

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
LX	*Subject* : **Active Relaxation of Unstriated Muscle by Dr. Inderjit Singh, Professor of Physiology, Medical College, Agra.** *Object* : The object of this scheme is to discover the nature of muscular contraction. *Scope* : Presently there are two theories of muscular contraction which are fundamentally opposed to each other. In the first, the mechanical response is supposed to result from chemical changes initiated by stimulation. In the second, mechanical energy is supposed to be released by the stimulus, from some reservoir or accumulator previously charged. Majority of the physiologists favour the former theory. *Author's record* : Working on unstriated muscle, the author discovered active relaxation, the phenomenon which supports the second theory. He further concluded that unstriated muscle contains both the above mechanisms, responsible for two kinds of contraction. If the findings of the author are correct, then his theory *i.e.* it is due to interference with active relaxation, will be more satisfactory. *Duration* : The scheme is expected to be completed in one year. *Grant asked for* : Equipment ... Rs. 16,000 (Cossor oscillograph, pre-amplifiers, camera stimulator etc.). Contingencies Nil. Staff Nil. Total Rs. 16,000 *Research Committee's recommendation* : The scheme has been referred to the Pharmaceuticals and Drugs Research Committee and some eminent physiologists for opinion.	LX. p. 259. The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the opinion of the Research Committee.	LX. p. 259. The Board endorsed the recommendation of its Committee.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
LIX	*Subject* : **Studies in Stereochemisty by Dr. Bawa Kartar Singh, Hony. Research Professor, Banaras Hindu University.** *Object* : The object of the scheme is to study the following aspects of stereochemistry: (*a*) rotatory and refractive dispersion of organic compounds; (*b*) co-relation of rotatory and refractive dispersion; and (*c*) nature of racemic modification. *Scope* : It is proposed to study both simple and complex rotatory dispersion of organic compounds with a view to co-relate rotatory power with chemical constitution. The value of refractive dispersion obtained from Maxwell-Sellimeir equation will be compared with those derived from Drude's equation for rotatory dispersion. The nature of racemic forms will be investigated by applying Roozeboom's Phase Rule methods on optically active derivatives of terpenes such as sulphonamides, sulphonates, aryl-imino and amino derivatives etc. Very little work has so far been done abroad on refractive dispersion of optically active organic compounds, while in India Dr. Bawa Kartar Singh and his collaborators have published 38 papers on rotatory dispersion and 6 on refractive dispersion. *Author's record and collaboration* : Miss Parukutty Amma whom Dr. Singh proposes to employ as the junior investigator is a 1st Class M.Sc. from Banaras Hindu University and has been working as a Research Assistant of the U.P. Scientific Research Committee at the Organic Chemistry Research Section of the Banaras Hindu University since July, 1952. She has studied optically active and racemic sulphonamides and sulphonates derived from terpenes and proposes to extend the work to other related compounds. *Duration* : The scheme is likely to take 2 years, in the first instance. *Grant asked for* :— Equipment (For purchase of thermostat, mercury lamp, cadmium lamp, and 3 silver cadmium electrodes). ... Rs. 2,000 Contingencies ... Rs. 1,000 Staff (One J.S.A on Rs. 200 in the scale of Rs. 160-10-330. One Lab. Asst. in the scale of Rs. 100-220). ... Rs. 5,004 (including allowances). Total Rs. 8,004 (including allowances). *Research Committee's recommendation* : The scheme has been referred to the Physical and Chemical Research Committees for opinion.	LIX. p. 257. The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the opinion of the Research Committee.	LIX. p. 257. The Board endorsed the recommendation of its Committee.

LATE ITEMS—RESEARCH SCHEMES

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
LXI	*Subject :* **Latency Relaxation in Unstriated Muscle by Dr. Inderjit Singh, Professor of Physiology, Medical College, Agra.** *Object :* The object of this scheme is to elucidate the mechanical changes that take place in a muscle before it contracts. *Scope :* Prof. Sandow holds that phenomenon of very slight relaxation in frog's muscle during the latter part of its latent period, just prior to the development of tension is a genuine physiological relaxation, whilst Prof. A.V. Hill thinks, that it is a physical artefact. *Author's record :* Dr. Inderjit Singh has noted that unstriated muscle relaxes sometimes prior to contraction. When compared to striated muscle its magnitude is so great and the movement of the muscle so slow, that it can be categorically stated that it is a genuine physiological phenomenon. He has also established that this phenomenon of latency relaxation is identical in striated and unstriated muscles. *Duration :* The investigation is expected to be completed within one year. *Grant asked for :* Equipment (A refrigerator, cenco hyvac pump). ... Rs. 3,400 Contingencies (Adenosine triphosphate 25 grams). ... Rs. 2,500 Staff ... Nil. Total Rs. 5,900 *Research Committee's recommendation :* The scheme has been referred to the Pharmaceuticals and Drugs Research Committee and some eminent physiologists for opinion.	LXI. p. 261. The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the opinion of the Research Committee.	LXI. p. 261. The Board endorsed the recommendation of its Committee.

LATE ITEMS—PROPOSAL TO INVITE FOREIGN SCIENTISTS

Item No.	*Particulars.*
LXII	*Subject* : **Proposal to invite Eminent Scientists from the United Kingdom to visit the N.C.L., Poona by Prof. G.I. Finch, F.R S. Director, National Chemical Laboratory.**

Synopsis :

Prof. G.I. Finch, F.R.S., Director, National Chemical Laboratory, has suggested that the following scientists may be invited from the United Kingdom to stay for a month at the N.C.L. as it would help and stimulate the research work there :

ORGANIC CHEMISTRY.

1. Prof. E.R.H. Jones, F.R.S., Manchester University.
2. Prof. D.H.R. Barton of Birkbeck College, London

} Two of the most active and inspired of the younger generation of organic chemists.

CHEMICAL ENGINEERING.

3. Dr. T.C. Fox, Cambridge University. — An outstanding man with energy and originality and making a great name for himself.
4. Prof. D.N. Newitt, F.R.S., Birmingham University. — Senior Chemical Engineer.

PHYSICAL CHEMISTRY.

5. Dr. H. W. Melville, F.R.S., Birmingham University. — Outstanding in his high polymer work.
6. Dr. H. W. Thompson, F.R.S., St. John's College, Oxford. — Has contributed greatly to infra-red absorption spectroscopy.

INORGANIC CHEMISTRY.

7. Dr. H.J. Emeleus, F.R.S., St. John's College, Oxford. — Notable contributions to fluorine and radio-active chemistry.
8. Dr. R. Scott Russell, who runs the radioactive tracer laboratory in plant physiology in Oxford would help in establishing a radioactive tracer laboratory in the N C.L.

Prof. Finch says that all these persons are well-known to him and are "endowed with drive and personality and are acknowledged experts in their chosen fields. Too big a round of university lectures and visits is likely to dissipate their energies fruitlessly. The average university student often cannot appreciate the more advanced and most interesting matter which such distinguished visitors from U.K. would have to impart. Prof. Todd remarked especially on this point when he visited the N.C.L. and wished that he had been able to spend much more time there than had been allowed for in his programme."

Prof. Finch has suggested July and August as proper months for these scientists to visit India.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
LXII. p. 263. The Committee recommended that the proposal to invite eminent scientists to India be considered in detail by the D.S.I.R. and after inviting suggestions from the appropriate Research Committees and the Advisory Boards of the National Laboratories it should be placed before the Board at their next meeting.	LXII. p. 263. The Board approved in principle the proposal to invite eminent scientists from abroad as Visiting Professors attached to the National Laboratories. Members were of the opinion that— (*i*) not more than one Professorship should be attached to one Laboratory, (*ii*) the stay should be for not less than one month, (*iii*) country-wide tours may be avoided, (*iv*) facilities of international organisations may be availed of, (*v*) the Director would suggest the names but the Advisory Boards and others may be consulted. The Board recommended that the D.S.I.R. be authorised to examine the financial and other aspects of the matter and put up a concrete proposal at the next meeting. It was also recommended that only specific requests should be considered and no circular letter need be issued.

LATE ITEMS—PROPOSAL FOR INSECTICIDE LABORATORY

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
LXIII	*Subject*: **Proposal to Establish a Central Insecticides Laboratory by Dr. H.S. Pruthi.** *Synopsis*: Dr. Pruthi has submitted a proposal for the establishment of a Central Insecticides Laboratory. Injurious insects play an extremely important part in affecting human welfare by causing damage to various agricultural crops and spreading diseases to man and his domestic stock. The more injurious species of these insects are therefore to be controlled and the most common and practicable method is by the use of suitable insecticides. India is at present importing insecticides worth about 1½ crores of rupees every year. A large number of such insecticides are widely advertised and sold but there is no arrangement at present for testing the quality of these insecticides with the result that consumers are often deceived and in the long run insect control work suffers. There is at present an Inter-Departmental Insecticides Committee on which the Ministries of Health, Agriculture, the Forest Research Institute and the C.S.I.R. are represented. This Committee reviews the work done on insecticides under various auspices and co-ordinates such activities. Hardly any insecticides have been evolved in India which can be used in the field for practical purposes. This Committee has also recommended that a Central Insecticides Laboratory should be established under the auspices of the C.S.I.R. for carrying out basic researches on insecticides, to assist the various organisations and Indian manufacturers to evolve, formulate and manufacture suitable insecticides for Indian conditions and for use in India from indigenous materials. This Laboratory should also be responsible for the standardisation of insecticides and testing of imported materials. The term 'insecticides' is used in a broad sense to cover raticides fungicides, weedicides etc. Such insecticides may be both organic and inorganic in origin as also from indigenous plant materials such as pyrethrum, rotenone containing plants etc. The scope of the Laboratory will be both fundamental and applied and it should be placed in charge of a highly qualified and experienced Entomologist so that the biological efficacy of various insecticides which might be evolved may be properly tested on a variety of injurious insects which are found in abundance in this couutry. Separate laboratories for such work are functioning in other countries. In U.S.A. and Canada there are number of such laboratories entirely devoted to insecticidal research, both chemical and biological. Research on insecticides has been in progress for some time in a few laboratories in India with financial aid from the C.S.I.R. Small schemes of research for evolving new insecticides are under-way in the Chemical Laboratory of the Delhi University and in the Central Drugs Laboratory, Calcutta. Recently a scheme has also been started at the Malaria Institute of India for		

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	assaying new insecticides. But the schemes are of *ad hoc* nature. Dr. Pruthi considers that the subject has not been given the consideration it deserves, and unless a separate laboratory is established such attention would not be secured. Dr. Pruthi has estimated an initial non-recurring grant of Rs. 50,000 towards equipment and recurring cost of Rs. 75,000 per year for staff and contingencies. He has also suggested that the Council may approve of the establishment of such a laboratory in principle after which he will prepare a detailed scheme.
LXIV	*Subject*: **Interim Recommendations of the Committee for Calendar Reform.** The Committee for Calendar Reform held its first meeting on the 21st & 23rd February 1953. Professor M.N. Saha, F.R.S., Chairman of the Committee, has communicated the following recommendations of the Committee :— (*i*) A National Solar Calendar for Civil purposes should be prepared under the auspices of the Government and the Lunar Panchang should be pegged on to this Calendar ; (*ii*) The Sayan reckoning should be followed for the reformed calendar and the length of the year would be 365.2422 days ; (*iii*) The first day of the National Solar Calendar should begin on the day after the Vernal Equinox. In places where the solar calendar is used for religious purposes April 13/14 may be the first day of the year for some time to come ; (*iv*) There should be five solar months of 31 days and seven months of 30 days in an ordinary year but in a leap year there should be six solar months of 31 days and 6 months of 30 days ; (*v*) The current Saka era should be adopted for the reformed Indian Calendar ; (*vi*) In the Indian system of time-reckoning the day should begin from mid-night to mid-night at an All-India Central Station for dating purposes only; for religious and other purposes the days may begin from sun-rise to sun-rise of the Central Station ; (*vii*) A place, 82½° East of Greenwich, and having a latitude of Ujjain should be recognised as the Central Station for India ; (*viii*) The lunar months should be new-moon ending and the lunar year should begin with Chaitra Shukladi ; (*ix*) The first point of Mesha is to be taken 23° 15′ ahead of the vernal equinoctial point and all calculations for the lunar calendar should be made on that basis ;

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
LXIII. p. 265-267. While agreeing with the views of Dr. H.S. Pruthi that greater attention than hitherto should be paid to research and standardisation of insecticides in India, the Committee did not consider it advisable to set up a new Institute for this purpose at present. The Committee noted that research on various aspects of insecticides and their standardisation was already being carried out under the auspices of the Ministry of Agriculture and the C.S.I.R. Some work was also underway at the Malaria Institute and the Technical Development Establishment, Kanpur. The Committee recommended that any additional work in the subject may be taken up in the N.C.L. The Committee further recommended that the D.S.I.R. be requested to arrange for the analysis of the various proprietary insecticides imported into India at costs higher than those made in India.	LXIII. p. 265-267. The Board endorsed the recommendations of its Committee.

LATE ITEMS – INTERIM RECOMMENDATIONS FOR CALENDAR REFORM

Item No.	*Particulars.*
	(*x*) The names of the months should continue to be called Chaitra, Vaisakh as at presnt, the appellation solar or lunar should be attached to them as the case may be ; (*xi*) In the National Calendar, Tithi should be given for the Central Station and calculations of time should be given in hours, minutes and seconds ; (*xii*) The Nakshatras should be given with Ashwini starting with Mesha ; (*xiii*) A National Calendar for the whole of India should be prepared for five years in advance showing year beginning, months, dates, tithis and nakshatras ; (*xiv*) Steps should be taken to compile an Indian Ephemeris and Nautical Almanac by the Government of India showing in advance the positions of the Sun, the Moon, the planets and other important heavenly bodies, for the use of the Navy, the Air Force and the Calendar-makers ; (*xv*) There should be a National Observatory at a suitable place provided with modern equipment. apparatus and time service ; (*xvi*) The Chairman may place before the Government the proposal that recommendation (*xiii*) above should be given effect to immediately. For this purpose the Committee recommended that Shri R.V. Vaidya of Ujjain and Shri Nirmal Chandra Lahiri of Calcutta, both members of the Committee, be appointed for the work of compilation of the National Calendar as per directions given in the above recommendations. It was also recommended that suitable assistants should be appointed to help Shri Vaidya and Shri Lahiri in this work. The following are the Budget Estimates : Staff ... Rs. 13,320 (including allowances) 4 Assistants—2 at Calcutta and 2 at Ujjain, on Rs. 200 p.m. The Assistants should be M.Scs. with Mathematics and with knowledge of Astronomy. Contingencies Rs. 2,000 T.A. Rs. 3,000 Total Rs. 18,320 (including allowances) The Chairman also recommended in addition that Messrs. Lahiri and Vaidya should be whole time workers for a period of one year and that in addition to their usual salaries they should be given 20% deputation allowance. They are expected to finish their work within a year. The opinion of the Committee was that a policy decision should be taken by the Government only after the tentative experimental calendar for 5 years has been prepared.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
LXIV. p. 267-269. The Committee was generally in agreement with the interim recommendations of the Committee for Calendar Reform. The Committee recommended that the proposal to prepare an experimental Calendar for 5 years in advance be approved and the following grant be made (*for six months*): Contingencies (including T.A.) Rs. 3,000 Staff: (2 Officers & 4 J.R.A's.) Rs. 10,580 (including allowances) Total Rs. 13,580 (including allowances) The Committee also recommended that the services of Mr. Lahiri and Mr. Vaidya be obtained on deputation for a period of six months. The Committee recommended that the Calendar Reform Committee be requested to make the tentative Calendar for 5 years available within a period of six months. as the proposed staff of 2 Officers and 4 Assistants would be adequate for this purpose. The Committee further recommended that the Calendar Committee be requested also to prepare a pamphlet setting forth the reasons underlying its various recommendations. The pamphlet along with the experimental Calendar should be circulated to the State Governments, various Organisations and individuals interested in the subject to elicit their views.	LXIV. p. 267-269. The Board endersed the recommendations of its Committee.

LATE ITEMS—PROCEEDINGS OF THE ATMOSPHERIC RESEARCH COMMITTEE

Item No.	*Particulars.*
LXV	*Subject* : **Proceedings of the Atmospheric Research Committee.** (*Chairman* : *Mr. V. V. Sohoni*) *Synopsis* : 1. A meeting of the Atmospheric Research Committee was held on Wednesday, the 11th February 1953 at New Delhi. 2. RESEARCH SCHEMES IN PROGRESS : (*i*) Infra-red Radiation from the Atmosphere and Solar Radiation by Dr. L.A Ramdas. The Beckman Infra-red Spectrophotometer had now been fitted with a high speed photographic recorder and provided with a medium sized heliostat and a Globar source for the study of infra-red absorption by ozone, water vapour, carbon dioxide etc. The infra-red absoption spectra of the Sun had been recorded on a number of days and the absorption spectra of a large number of crystals studied. The Committee recommended the scheme for renewal for another year. (*ii*) (*a*) Atmospheric Ozone and Weather by Dr. K R. Ramanathan. With the new sensitive ozone spectrograph Dr. Ramanathan had been able to take observations even at night with the moon and to study the variations in the ozone amount during the night and in the day time. Regular observations of the total ozone amount and 'umkehr' observations for determining the vertical distribution of ozone had been taken at Mount Abu for over a year and had yielded results of great interest. Besides the usual annual variation, large day-to-day variations during the months January to March occur, when western disturbances are active. Significant rises in ozone amounts occur with or shortly after the passage of low pressure centres, the main increase taking place in the layer 18-27 km. and a smaller increase in the layer 9-18 km. Dr. Fournier working in Pakistan had sent him three months ozone data for Quetta and requested that similar data for Indian stations be sent to him. The Committee *recommended extension of the scheme for another year.* (*b*) *Ozone Observations at Kodaikanal* : The question of ozone observations to be taken at Kodaikanal was raised. It was understood that the fourth instrument already recommended in December 1951 could not be obtained due to lack of funds. Dr. S.C.Roy stressed the importance of ozone observations at Kodaikanal, specially in relation to the study of the ionosphere. Mr. A.K. Roy stated that ozone observations at Kodaikanal were required to be taken as part of the programme for International Polar Year, 1957, which had been endorsed by the C.S.I.R. The Committe recommended strongly to the C.S.I.R. the purchase of a Ozone Spectrograph by them so that one of the India Meteorological Department Instruments may be released for Kodaikanal without delay.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
LXV. Atmospheric Research Committee. 1. p. 271. The Committee noted.	**LXV. Atmospheric Research Committee.** 1. p. 271. The Board noted.
2. (*i*) p. 271. The Committee recommended renewal of the Research Scheme on Infra-red Radiation from the Atmosphere for the year 1953-54 with the following grant:— Equipment — Unspent balance Contingencies — Rs. 2,000 Staff: (1 S.R.A. and 1 J.R.A.) — Rs. 8,465 (including allowances) Total — Rs. 10,465 (including allowances plus unspent balance under 'Equipment')	2. (*i*) p. 271. The Board endorsed the recommendation of its Committee.
(*ii*) (*a*) p. 271. The Committee recommended that the Research Scheme on Atmospheric Ozone and Weather be continued during 1953-54 for which the following grant be made:— Equipment — Unspent balance Contingencies — Rs. 2,000 Staff: (1 S.R.A. 1 J.R.A. and 1 S L.A.) — Rs. 10,071 (including allowances) Total — Rs. 12,071 (including allowances plus unspent balance under 'Equipment')	(*ii*) (*a*) p. 271. The Board endorsed the recommendation of its Committee.
(*b*) p 271. The Committee agreed with the opinion of the Research Committee and recommended that the Ministry of Finance be approached for additional funds for the purchase of an Ozone Spectrograph either by the India Meteorological Department or the C.S.I.R.	(*b*) p. 271. The Board agreed with the opinion of the Research Committee and endorsed the recommendation of its Committee.

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*iii*) Study of Microseisms and Sea-waves and their Correlation with Cyclonic Disturbances by Dr. S.K. Chakrabarty : *Continuance of the scheme was recommended.* (*iv*) Colloidal Instability of Cloud Particles Above & Below the Freezing Point by Dr. S.K. Banerjee and New Scheme on Inducing Clouds to Rain in Scarcity Areas, by Dr. S.K. Banerji. Dr. Banerji stated that in view of the discussions at the symposium on artificial rain that a better organisation was needed for the production of artificial rain, he wished to withdraw his new scheme and the current scheme was also to be terminated. 3. NEW SCHEMES : Measurement of the Electrical Potential Gradient in the Upper Air by Shri S.P. Venkiteshwaran. The Committee considered that the work fell within the scope of the India Meteorological Depatment and that the Director-General of Observatories may be requested to give suitable assistance to Mr. Venkiteshwaran for carrying out this work and that the highest priority possible should be given to this problem. (The scheme has already been considered under Item No. XXXI pages 69-71 of the main agenda). 4. HIGH ALTITUDE RESEARCH STATION ON THE HIMALAYAS : Mr. Sreenivasaiah briefly stated the present position regarding plans for a High Altitude Research Station in the Himalayas. It had been decided by the Expert Sub-Committee for Planning the High Altitude Research Station that (1) it would be desirable to have a full picture of the winter conditions in the Badrinath-Manna Pass region as well as in the Sikkim Himalayan region by posting observers there, (2) the Director-General of Observatories should call for volunteers from his department for such observations during 1952-53 and (3) the objectives of the proposed research station be stated more precisely than had hitherto been done. Mr. Sreenivasaiah stated that very few members had volunteered for the work and since no reply had yet been received from the Political Officer in Sikkim, it had not been possible to arrange for the observations at Manna or Thanggu. The statement of objectives of the proposed research station was under preparation. Mr. A.K. Roy suggested that better response might be obtained if the invitation was extended to Universities and other organisations all over India. It was ultimately decided that an observatory at 16,000 to 18,000 ft. for taking observations all the year round was not feasible. Dr. Gale was requested to enquire whether the Army had a post anywhere near Badrinath and whether it would be possible to attach some observers to the nearest Army Unit for observations at the higher level.	(*iii*) p. 273. The Committee recommended sanction of the following grant for continuance of the Research Scheme on Study of Microseisms etc., during 1953-54. Equipment — Nil Contingencies — Rs. 1,000 Staff: (1 SRA). — Rs. 4,623 (including allowances) Total — Rs. 5,623 (including allowances) (*iv*) p. 273. The Committee recommended that departmental action already taken to terminate the scheme be approved. 3. p. 273. The Committee noted that the scheme had already been considered under Item XXXI p. 69-71 of this agenda.	(*iii*) p. 273. The Board endorsed the recommendation of its Committee. (*iv*) p. 273. The Board endorsed the recommendation of its Committee. 3. p. 273. The Board noted.

LATE ITEMS—PROCEEDINGS OF THE ATMOSPHERIC RESEARCH COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	The Committee felt that at least for some years to come and until necessary facilities for winter stay of workers at heights of 16,000-18,000 feet were provided, an all the year round observatory at those heights would not be feasible nor necessary. It was therefore considered unnecessary to have winter weather conditions especially observed and recorded by small observing parties.	4. p. 273-275. The Committee noted that the Chairman of the Expert Committee had since suggested that the C.S.I.R. may address the various technical departments, scientific organisations, universities, and individual scientists with a view to ascertaining. (*i*) Whether a senior scientist was prepared to lead a party of workers to high level locations in the Himalayas; (*ii*) Whether a suitable party or workers could be got together; (*iii*) What were the problems which they desired to be taken up for investigation and what facilities were needed. The Committee recommended that information on the lines suggested be obtained and placed before the Expert Committee who may be requested to consider the question in all its aspects, prepare the scope and functions and other details of the proposed Research Station, and recommend the precise course of action to be adopted for the establishment of the Research Station, if considered necessary.	4. p. 273-275. The Board noted and endorsed the recommendation of its Committee.
	5. INDIA METEOROLOGICAL SOCIETY : Mr. Sreenivasaiah stated that about 180 of the 450 people addressed to, have expressed themselves in favour of the formation of the Society. The constitution, rules and regulations of the proposed society were being drafted by a small working group.	5. p. 275. The Committee noted.	5. p 275. The Board noted.
	6. STUDIES ON MICROSEISMS, SEA-WAVES AND SWELLS : Mr. Sreenivasaiah reported that a tripartite microseismograph station had been started at Madras and that two officers of the Department had been trained in observtions of sea-waves and swells in the I.N.S. 'Investigator' in March-May 1952. In view of this it was suggested that there was no need at present of sending the Inspecting Professional Assistants from the Department for training.	6. p. 275. The Committee noted and endorsed the opinion of the Research Committee.	6. p. 275. The Board noted and endorsed the opinion of the Research Committee.
	7. THE MERGER OF THE ARTIFICIAL RAIN-MAKING COMMITTEE OF THE CSIR WITH THE ATMOSPHERIC RESEARCH COMMITTEE. Letters from Dr. Finch, Dr. Kothari and S/Ldr. Srivastava agreeing to the above were considered and the Committee agreed in principle to the merger.	7. p. 275. As the general consensus of opinion amongst members of the Atmospheric Research Committee and the Artificial Rain Committee was in favour of merger of the two Committees, the Committee recommended it. If there was any necessity to have any special Committee to consider the subject in future, the Committee recommended the formation of a Sub-Committee under the Atmospheric Research Committee.	7. p. 275. The Board noted and endorsed the recommendation of its Committee.
	8. SYMPOSIUM ON ARTIFICIAL RAIN : It was recommended that the papers presented at the Symposium on Artificial Rain be printed as a separate report for which the Steering Committee may act as the Editorial Committee.	8. p. 275. The Committee endorsed the recommendation of the Research Committee.	8. p. 275. The Board endorsed the recommendation of the Research Committee.
	9. CONCLUSIONS AND RECOMMENDATIONS REGARDING RAIN-MAKING : On the 9th and 10th February 1953 a Symposium on Artificial Rain was held in which a large number of scientists from various parts of India took part and over 20 papers were presented. The Atmospheric Research Committee after a detailed survey of the work done in different parts of the world on artificial stimulation of rainfall from clouds and after taking full note of the discussions in the Symposium prepared a statement of conclusions and recommendations. The statement consists of: (A) a preamble on the present position regarding artificial rain-making; (B) recommendations for (*i*) Rain Research Unit at the headquarters in New Delhi; (*ii*) a Unit at Poona for investigation of problems in cloud physics; and (*iii*) continuation of Dr. S.K. Banerji's laboratory and field experiments in Calcutta in the next pre- and post-monsoon season, and also at		

LATE ITEMS—PROCEEDINGS OF THE ATMOSPHERIC RESEARCH COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	A. *Preamble* : (*i*) The woke done so far has shown that some clouds satisfying certain conditions can be stimulated to produce precipitation on a restricted and local scale by artificial seeding. Artificial seeding can be useful only when clouds which are potentially capable of giving rain are already present, but fail to release precipitation because of the absence of suitable nuclei which are necessary for the growth of the cloud particles to rain-drop size. There is yet very little evidence and no adequate scientific basis for the belief that it is possible to modify or control the rainfall or weather of an area. The importance of the subject and the knowledge already gained are however sufficient to warrant sustained research work on the scientific and technological problems of artificial stimulation of rainfall. (*ii*) There are many areas and occasions in India when clouds, which may be capable of artificial stimulation, form and dissipate without precipitation. But actual research and trials are required to find what kinds of clouds, in which areas and under what conditions of weather, can be induced to yield precipitation and, if so, how much and how frequently. (*iii*) Experiments have been carried out in Calcutta by Dr. Banerji during the last year to induce rainfall from clouds by dispersing various kinds of seeding material from meteorological balloons. The Atmospheric Research Committee have reviewed the results of these experiments and come to the conclusion that the evidence is insufficient to show that the rainfall that was observed to follow the seeding was actually due to the seeding and not due to natural causes. The balloon technique is comparatively simple and inexpensive, but suffers from the disadvantage that the balloons being uncontrolled, are carried about by wind and it is generally not possible to locate the individual cloud which was seeded and follow the consequences of the seeding. The difficulty of assessment is particularly great when the clouding is general and there is distributed rainfall round about the place of the experiments. (*iv*) The technique that has been mainly used in other countries is the seeding of selected individual clouds followed by continuous observation of the changes that take place in the seeded clouds from ground, from aeroplanes, and by radar. Very often, the changes of similar but unseeded clouds in the neighbourhood have also been continuously observed. Even with all available technical help, it has been found difficult in many cases to decide whether the results of experiments on artificial seeding have been due to the seeding or due to natural causes. B. *Recommendations* : In view of the undecided nature of the results of rain-making experiments that have so far been made, it is the opinion of the Atmospheric Research Committee that the time has now come when India should set up a Rain Research Unit for trying out various methods of cloud seeding and accumulate necessary technical knowledge and experience in the subject of rain-making. As		

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	the work requires the co-operation of many different kinds of knowledge and skill, the formation of such a unit can only be undertaken by the Government of India. (*i*) Rain Research Unit at Delhi. The function of this Unit will be: conduct of research and planned field experiments on the seeding of clouds, observation of subsequent behaviour of such seeded clouds, and detailed assessment of the results of seeding experiments. The use of aircraft is implicit in this proposal, at least two centimetre radars are required for the tracking of these clouds. It will not be possible for the Unit to operate unless the Indian Air Force is prepared to assist by supplying aircraft required for the field trials. Similarly, maximum use must be made of existing agencies which can provide the other forms of assistance needed in connection with this study, such as radar information, local and synoptic meteorological data. The conditions which govern the location of the unit, or at any rate of its main base, are— (*a*) proximity to an I.A.F. Station which is equipped with centimetre radar, and also to a weather station with good meteorological facilities. (*b*) suitable meteorological conditions as would permit a large number of seeding experiments being made on non-raining clouds. It is the opinion of the Atmospheric Research Committee that Delhi is a suitable base for the proposed Unit. It should of course be possible for the Unit to arrange actual field experiments being made over the neighbouring areas. The co-operation of the Indian Air Force is of course fundamental to this scheme. An aircraft capable of flying between 20,000 ft. and 25,000 ft. is needed The aircraft would have to be modified to permit the dispersal of the seeding material, but such modifications should not present much difficulty. It would be necessary, in connection with some of the experiments, to carry and drop small explosive charges for the dissemination of seeding material. The staff required for the Unit is estimated to be— One Scientist of standing to be in charge. Two Research Officers, who would be required to fly in aircraft as passengers and direct seeding operation from the air and to make the necessary subsequent observations. Three Research Assistants, one Clerk, two Instrument Mechanics, two Laboratory Attendants. The unit would have to include at least one person qualified to perform the statistical analysis of trials and observations.

Recommendations of the Committee of the Board.	*Recommendations of the Board.*

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*ii*) Cloud Physics Research Unit at Poona: Side by side with the suggested project of systematic rain-making trials to be conducted by the proposed Rain Research Unit at Delhi, it is very necessary that we should carry out a comprehensive programme of fundamental studies on cloud physics in this country. Measurements of liquid water content in different layers of clouds, determination of drop size-spectra of water particles in clouds at various stages of their developments, measurement of vertical currents in clouds, etc., are important not only for theoretical studies of the physics of clouds and rain formation, but would be of direct value in connection with the rain-making trials themselves, by enabling us to decide which types of clouds are more likely to be stimulated to yield precipitation, and also to estimate the amount of seeding materials that may be needed for successful operation in different circumstances. The Committee recommended that the proposed Research Unit for measurements in clouds may be located at Poona, where with the existing technical facilities available in the Meteorological Office and its attached workshop, and with the co-operation of the local Air Force Unit, it would be possible to set up the desired organisation. The proposed unit may work under the direction of a suitable Senior Officer of the India Meteorological Department posted at Poona and have the following staff:— One Junior Scientific Officer, 1 Senior Research Assistant, 1 Mechanic, 1 Laboratory Attendant. (*iii*) Continuation of Further Trial Experiments at Calcutta and also at One Other Station in South India for a Period of One Year by the Use of the Balloon Technique of Dr. S. K. Banerji, Calcutta. Although, in the opinion of this Committee, the seeding of clouds from aircraft provides the best and most practical method of rain-making trials, and the balloon method of seeding, for reasons stated earlier, suffers from some inherent limitations, considering (*a*) that some time and attention has already been given by Dr. Banerji in trying out the inexpensive technique of balloon seeding, and (*b*) that the experiments so far conducted by him have not been sufficiently systematic for proper assessment of the results, the Committee recommends that more systematic and well planned trials using the balloon technique may be carried out for a further period of, say, one year. Even if the results of the experiments under the project, as recommended, ultimately show that seeding of clouds will not lead to a substantial modification in the rainfall over an area, the valuable knowledge of cloud structure and cloud processes which will be gained as a result of the experiments, would be of fundamental importance not only to meteorologists but also to		

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	Air Force and to all those who are interested in aviation in this country. A knowledge of the possible modifications of cloud structure as may be produced by seeding processes, such as, the dissipation of certain types of clouds is bound to be of the greatest interest to the Air Force. [*Dr. Banerji's Scheme* :—It is proposed to carry out further experiments at Calcutta with different seeding agents, such as silver iodide, cadmium iodide, calcium chloride, sodium chloride, etc., in relation to growth of cloud particles and exciting chain reaction. Trial field experiments with balloons and automatic gadgets will be carried out at Calcutta, particularly during the pre-monsoon and post-monsoon periods for further development of the technique. As it is desirable to carry out experiments by baloon technique at a station where conditions for a cloud to give rain by the natural process are not as favourable as at Calcutta, it is also proposed to carry out field experiments at another station in Satara District of Bombay. The equipment collected for experiments at Calcutta will be continued to be used for the present experiments. The following grant is needed (for both the Stations) : Equipments (Balloons, hydrogen, automatic attachments etc.) ... Rs. 20,600 Contingencies (Including T.A. and renting accommodation at the 2nd station). ... Rs. 6,000 Staff : (One S.S.A. for 2nd station. One J.S.A. for Calcutta. Two Mechanics and One Attendant.) ... Rs. 11,040 (including allowances). Total Rs. 37,640 (including allowances). The D.G.O. may be requested to supply hydrogen (six cylinders at a time) at Satara. If the D.G.O. gives hydrogen free, Rs. 6,000 may be saved. Collaboration of the Meteorological Department would be necessary and for the Satara Station, the D.G.O. may also be requested to spare the services of Dr. A.K. Mukherjee from 1st April to 31st October 1953

Recommendations of the Committee of the Board.	*Recommendations of the Board.*
9. p. 275-283. The Committee agreed with the views of the Atmospheric Research Committee on the present knowledge and on the experiments done so far on Artificial Rain Making. The Committee was of the opinion that considerable amount of fundamental research in cloud physics, rain-formation and also cloud seeding would be necessary before the technique of artificial stimulation of rain could be employed to any practical purpose. The Committee was in general agreement with the recommendations of the Atmospheric Research Committee for setting up of a Rain Research Unit at Delhi and a Cloud Physics Research Unit at Poona. Since these Units could function effectively only with the collaboration of other departments, especially the I.A.F. and since considerable additional funds would be necessary, it was recommended that the entire scheme be placed before the Cabinet for a decision. As regards the balloon technique of seeding, the Committee was of the opinion that it would be useful only if a battery of balloons were released over an area. The Committee thought such experiments should also be planned and carried out on an adequate scale; the Rain Research Unit when formed would be the most suitable place for such experiments. The Committee, therefore, did not recommend the continuance of the experiments at Calcutta for the present. At the instance of Dr. Bhabha, the Committee recommended that the problem of Evaporation of Water from Storage reservoirs for irrigation and hydro-electric purposes be referred to the appropriate body for examination. It was also recommended that the subject be considered at the next meeting of the Directors of National Laboratories.	9. p. 275-283. The Board endorsed the recommendations of its Committee.

LATE ITEMS—PROCEEDINGS OF THE RADIO RESEARCH COMMITTEE

Item No	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
LXVI	*Subject* : **Proceedings of the Radio Research Committee.** (*Chairman* : *Dr. K.S. Krishnan*). *Synopsis* : 1. A meeting of the Radio Research Committee was held in New Delhi on the 9th January, 1953. 2. RENEWAL OF RESEARCH SCHEMES : (*i*) Ionospheric Investigations—Prof. S.K. Mitra. It was recommended that the scheme be renewed for another year with the following grant :— Equipment ... Nil Contingencies ... Rs. 1,000 Staff ... Rs. 22,940 (including allowances) (4 Junior Research Assistants 1 Senior Research Assistant 1 Clerk 1 Trained Laboratory Bearer). Total Rs. 23,940 (including allowances) Last year, the investigator was sanctioned an equipment grant of Rs. 7,500 for purchasing the following specific equipments :—one signal generator, one avometer, two milliammeters, and two power supply units. But the investigator utilised this amount for purchasing a calculating machine, oscillograph, camera, etc. which were needed by him, and again applied for a grant of Rs. 8,000 for purchase of the above equipments. In view of this, the Committee recommended that the attention of the Director, Scientific & Industrial Research, be drawn to it and the Chairman may take such action as was necessary after consulting the D.S.I.R. The investigator also applied for a grant of Rs. 9,598/6/- for appointing additional staff for the new ionospheric station at Haringhata. The Committee recommended that the additional staff needed for the permanent Haringhata station be decided by the C.S.I.R. at the proper time. (*ii*) Investigations on Radio Valves—Prof. S.K. Mitra. The Committee did not recommend the extension of the grant-in-aid for the scheme.	LXVI. **Radio Research Committee.** 1. p. 285. The Committee noted. 2. (*i*). The Committee endorsed the recommendations of the Research Committee. (*ii*). The Committee noted that Prof. S.K. Mitra had since specially requested for the continuance of the Research Scheme on Radio Valves. In view of the reasons given by Prof. Mitra the Committee recommended the renewal of the scheme with the following grant for the year 1953-54. Equipment Rs. 1,000 Contingencies Rs 1,000 Staff: Rs. 11,374 (including allowances) (1 S.R.A., 1 Glass Blower, 1 Mechanic, 1 Bearer). Total Rs. 13,374 (including allowances) It was also recommended that Prof. Mitra be requested to conclude the work in the scheme as soon as possible.	LXVI. **Radio Research Committee.** 1. p. 285. The Board noted. 2 (*i*). The Board endorsed the recommendations of the Research Committee. (*ii*). The Board noted and endorsed the recommendations of its Committee.

LATE ITEMS—PROCEEDINGS OF THE RADIO RESEARCH COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*iii*) Polarisation of Downcoming Radio Waves—Dr. S.R. Khastgir. It was recommended that the scheme be renewed for another year and the investigator b requested to complete the work definitely before February 1954. Equipment ... Nil Contingencies ... Rs. 600 Staff ... Rs. 3,816 (including allowance: (1 Junior Research Assistant and 1 Bearer) Total Rs. 4,416 (including allowances)	(*iii*), (*iv*) & (*v*) p. 287. The Committee recommended the continuance of the following Research Schemes with the grants noted against each for the year 1953-54. (*iii*) Polarisation of Downcoming waves. (to be completed by February, 1954.) Rs. 4,416 (including allowances)	
	(*iv*) Study of the Nature of Atmospherics—Dr. S.R. Khastgir. The Committee recommended the continuance of the scheme for the year 1953-54 wit the following grant :— Equipment ... Rs. 1,500 Contingencies ... Rs. 500 Staff ... Rs. 3,158 (including allowances) (1 Junior Research Assistant) Total . Rs. 5,158 (including allowances)	(*iv*) Nature of Atmospherics. Rs. 5,158 (including allowances)	
	(*v*) Investigations on R.C. Coupled F.M. Oscillator—Prof. H. Rakshit. The Committee recommended the renewal of the scheme for a further period of six month and noted that the work would be completed by August 1953. Equipment ... Nil Contingencies .... Rs. 250 Staff ... Rs. 1,650 (including allowances) (1 Junior Research Assistant) Total Rs. 1,900 (including allowances	(*v*) R. C. coupled F.M. Oscillator. (to be completed by August, 1953). Rs. 1,900 (including allowances)	(*iii*), (*iv*) & (*v*) p. 287. The Board endorsed the recommendations of its Committee.

LATE ITEMS—PROCEEDINGS OF THE RADIO RESEARCH COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*vi*) Recording and Analysis of Reflection of Electromagnetic Waves from the Ionosphere at Ahmedabad—Dr. K. Ramanathan. The Committee recommended the continuance of the scheme with the following grant :— Equipment ... Rs. 2,500 *Contingencies ... Rs. 5,000 Staff ... Rs. 8,051 (including allowances) (1 Senior Research Assistant 1 Junior Research Assistant) Total 15,551 (including allowances) *The contingency grant of Rs. 5,000 was recommended for the photographic paper and chemicals required for the automatic ionospheric recorder costing about Rs. 4,250.	(*vi*), (*vii*) & (*viii*) p. 289. The Committee recommended the continuance of the following Research Schemes during 1953-54 and sanction of the grants noted against each: (*vi*) Reflection of E.M. waves from Ionosphere. Rs. 15,551 (including allowances)	
	(*vii*) Absorption of Microwaves in 3 cm. region—Mr. Krishnaji. It was recommended to renew the scheme for the year 1953-54 with the following grant :— Equipment ... Nil Contingencies ... Rs. 1,200 Staff ... Rs. 4,194 (including allowances) (1 Junior Research Assistant, 1 Mechanic) Total Rs. 5,394 (including allowances)	(*vii*) Absorption of Microwaves. Rs. 5,394 (including allowances)	
	(*viii*) Scattering of Radio Waves—Dr.S.S. Banerjee. It was recommended that the scheme be renewed for the year 1953-54 and the investigator be requested to complete the work before February 1954. Equipment ... Nil Contingencies ... Rs. 500 Staff ... Rs. 2,682 (including allowances) (1 Junior Research Assistant) Total Rs. 3,182 (including allowances).	(*viii*) Scattering of Radio waves. (to be completed by February 1954). Rs. 3,182 (including allowances)	(*vi*), (*vii*) & (*viii*) p. 289. The Board endorsed the recommendations of its Committee.
3. NEW RESEARCH SCHEMES :			
	(*i*) Microwave Technique and its Applications—Dr. Rangadhama Rao. The Committee recommended that the investigator be requested to confine his investigations for the present to the study of the dielectric properties of substances of specific frequencies upto 30,000 mc/s and that the author be requested to modify the title of the scheme accordingly.		

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	The following grant was recommended : Equipment ... Nil Contingencies ... Rs. 3,000 Staff ... Rs. 3,120 (including allowances) (1 Junior Research Assistant) Total Rs. 6,120 (including allowances) The contingency grant of Rs. 3,000 was recommended for constructing the necessary equipment. (The scheme has already been considered under Item No. XXXVII 2. (*i*) page 95 of the main agenda.)	3 (*i*) p. 289-291. The Committee noted that the scheme had already been considered under item XXXVII 2 (*i*) of this agenda.	3 (*i*) p. 289-291. The Board noted.
	(*ii*) Investigations on Travelling Wave Disturbances in the Ionosphere by Spaced Receiver Method—Dr. B Ramachandra Rao. The scheme was recommended for sanction with the following grant :— Equipment ... Rs. 15,000 Contingencies ... Rs. 1,000 Staff ... Rs. 6,900 (including allowances). (1 Senior Research Assistant 1 Junior Research Assistant) Total Rs. 22,900 (including allowances). It was pointed out that the four communication receivers required by the investigator might be available from Disposals Stores and therefore he should contact the Chairman, Radio Research Committee for obtaining these. Further, as the investigator agreed to build the transmitter himself, it was felt that an amount of Rs. 15,000 will be enough to commence the work. (The scheme has already been considered under Item No. IV pages 5-7 of the main agenda).	p. 291. The Committee noted that the scheme had already been considered under Item IV p. 5-7 of this agenda.	(*ii*) p. 291. The Board noted.
	4. The Committee considered a proposal from the Indian Standards Institution for exploring the possibility of indigenous manufacture of insulating paper for use in transformers, condensers and chokes. It was recommended that the proposal be referred to the Forest Research Institute, Dehra Dun.	4. p. 291. The Committee endorsed the recommendation of the Research Committee.	4. p. 291. The Board endorsed the recommendation of the Research Committee.
	5. The Committee considered the proposal that research work be undertaken in India to explore the possibility of manufacture of the following articles required by the radio industry : (*a*) High permeability cores for transformers and chokes,		

LATE ITEMS—PROCEEDINGS OF THE RADIO RESEARCH COMMITTEE

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*b*) Modern types of permanent magnets for loudspeakers. (*c*) Special foil requirements for condensers. (*d*) Very thin enamelled copper wires and litz wires. It was recommended that a report be prepared by Mr. T.V. Ramamurthi of the National Physical Laboratory of India on this subject for consideration by the Committee at the next meeting. Mr. Mahalingam said in this connection that the Indian Telephone Industries had collected considerable data on (*a*) and he agreed to send it to the Chairman. Item (*b*) was referred to the National Metallurgical Laboratory, and items (*c*) and (*d*) to the National Physical Laboratory of India.	5. p. 291-293. The Committee endorsed the recommendation of the Radio Research Committee.	5. p. 291-293. The Board endorsed the recommendation of the Radio Research Committee.
	6. The Committee considered a proposal from the International Council of Scientific Unions for formation of a National Committee to organise the Third International Geophysical (Polar) Year for 1957-58. It was recommended that a Sub-committee be formed under the Radio Research Committee consisting of the following members:— (*i*) Chairman, Radio Research Committee (*ii*) Prof. S.K. Mitra (*iii*) Dr. H.J. Bhabha (*iv*) Dr. K.R. Ramanathan (*v*) Director, Solar Physics Observatory, Kodaikanal.	6. p. 293. The Committee endorsed the recommendation of the Research Committee for the formation of a Sub-Committee consisting of the following to organise the Third International Geophysical (Polar) Year. (*i*) Chairman, Radio Research Committee. (*ii*) Prof. S.K. Mitra. (*iii*) Dr. K.R. Ramanathan (*iv*) Dr. H.J. Bhabha (*v*) Director, Solar Physics Observatory, Kodaikanal. The Committee also recommended that the Govt. of India be requested to recognise the Sub-Committee as the National Committee in India for this purpose.	6. p. 293. The Board endorsed rhe recommendations of the Research Committee and the Committee of the Board.
	7. The Committee recommended that the Ministry of Defence be requested to continue the radar training scheme which had been found very useful.	7. p. 293. The Committee recommended that the Ministry of Defence be requested to extend the Radar and Micro-wave training scheme for civilian scientists during 1953-54 also. The Committee also recommended that the D.S.I.R. be authorised to take necessry action dapartmentally to select suitable scientists and sanction necessary funds towards the stipends in consultation with the Chairman of the Research Committee.	7. 5. 293. The Board endorsed the recommendations of its Committee.
	8. It was recommended that the National Physical Laboratory of India be requested to set up standards of time, frequency and tone, to implement the recommendations of the U.R.S.I.	8. p. 293. The Committee endorsed the recommendation of the Radio Research Committee.	8. p. 293 The Board endorsed the recommendation of the Radio Research Committee.
	9. Professor Sreenivasan and Mr. Baliga pointed out that the Radio Research Committee had been mainly sponsoring investigations on requests from investigators. For the advancement of radio research in the country the Committee should initiate and plan new research schemes and should distribute these problems to the institutions which were capable of and were willing to cooperate with the Committee. It was recommended to appoint a Sub-committee consisting of Chairman, Radio Research Committee Professor S.K. Mitra Professor K. Sreenivasan Mr. B.V. Baliga Dr. M.B. Sarwate to recommend as to what research programmes may be sponsored by the Committee.	9. p. 293. The Committee was of the opinion that development of a number of centres of Radio Research in the country was of great national importance. The Radio Research Committee being the Indian National Committee for Radio Research should, therefore, prepare a planned programme of research covering the various aspects of the subject and laying down the priorities. Appointment of the Sub-Committee for this purpose was recommended. The Sub-Committee may be requested to submit its proposals for consideration of the Research Committee at its next meeting.	9. p. 293. The Board noted and endorsed the recommendation of its Committee.

LATE ITEMS—PROCEEDINGS OF THE B. S. I. R., HYDERABAD-DN.

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	10. The Chairman reported that Mr. Govind Swarup, Secretary of the Radio Research Committee had been offered a Research Fellowship for study of Radio Astronomy in Sydney and would be leaving shortly. The Committee felt that in appointing a Secretary in place of Mr. Govind Swarup, it was desirable to revive the grade of Scientific Officer for the Secretaryship of this Committee, since the Radio Research Committee had now to initiate, as the National Committee for Radio Research in India, an extensive programme of work in connection with implementing the recommendations of the U.R.S.I. and also to implement the decision of the C S.I R to undertake publication of ionospheric data collected from various stations in India.	10. p. 295. The Committee recommended that an Officer in the grade of S.S.O. be appointed as Secretary of the Radio Research Committee. It was also recommended that the work of correlation and publication of Ionospheric data, already decided upon by the C.S.I.R., be taken up immediately.	10. p. 295. The Board endorsed the recommendations of its Committee.
LXVII	*Subject* : **Proceedings of the Board of Scientific & Industrial Research, Hyderabad-Dn.** *Synopsis* : 1 A meeting of the Board of Scientific & Industrial Research, Hyderabad, was held on the 23rd December 1952, at Hyderabad-Dn.	LXVII. **BSIR—Hyderabad.** 1. p. 295. The Committee noted.	LXVII. **B.S.I.R.—Hyderabad.** 1. p. 295. The Board noted.
	2. ACTION TAKEN SINCE LAST MEETING : (*i*) Low Temperature Carbonisation Plant : Erection of the Low Temperature Coal Carbonisation Plant was proceeding satisfactorily. Experts from Germany were expected early for finalising the erection and operation programme. A suitable gear for raising the cooler has been installed. (*ii*) Restriction on Felling of Mohwa Trees : Legislation regarding restriction on the indiscriminate felling of Mohwa trees has been promulgated. As both the Forest Department and the P.W.D. were unwilling to take action regarding the extension of cultivation of Mohwa trees, the Board recommended that the Government may set up a Land Management Board for the propagation of Mohwa in view of its economic importance.	2 (*i*) & (*ii*) p. 295. The Committee noted.	2 (*i*) & (*ii*) p. 295. The Board noted.
	(*iii*) Grading of Coal : The Secretary, Commerce and Industries Department, had discussed the matter with the General Manager, Singareni Collieries. It was not a practical proposition as coal was not being carbonised on an industrial scale. The grading would involve additional expenditure for the collieries without possibility of profit. It was decided that the question of grading of coal according to ash content may be postponed.	2 (*iii*) p. 295. The Committee was of the opinion that grading of coal was a matter on which there should be All India uniformity. It was, therefore, recommended that the B.S.I.R., Hyderabad be requested to consult the Coal Board and the Fuel Research Institute before taking further action in the matter.	2 (*iii*) p. 295. The Board endorsed the recommendation of its Committee.

Item No	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	(*iv*) Survey of Medicinal Plants : It was not possible for the Forest Department to undertake a quantitative survey of medicinal and economic plants. The Finance Minister said that recent developments in synthetic drugs had almost replaced the naturally occurring medicinal plants. Only few plants of medicinal importance may be cultivated. Dr. Habib Hasan, however, drew attention to the survey of medicinal plants being carried out by Col. Chopra. A rough idea of the consumption of indigenous drugs could be obtained from the dealers of the State who had formed a co-operative society. It was decided to postpone the idea of a detailed survey of medicinal and economic plants. The Chief Conservator of Forests would give a rough estimate of the availability of important plants.	(*iv*) p. 297. Even though a number of synthetic durgs had recently been developed, the Committee considered that many of the naturally occurring drugs would still remain valuable. A survey of indigenous drugs resources would, therefore, be useful.	(*iv*) p. 297. The Board endorsed the views of its Committee.
	3. WORK UNDER THE RESEARCH COMMITTEES : (1st April, 1952 to 30th Sept. 1952). The Board noted the progress of researches under the following Committees : (a) Vegetable oils, (b) Fuel, (c) Heavy Chemicals, (d) Pharmaceuticals & Drugs, (e) Fibre, (f) Industrial Ferments, (g) Forest Products and (h) Pilot Plants. (*i*) Samples of soap from custard apple seed oil were exhibited ; (*ii*) It was recommended that the Government of India be requested to make a free gift of 5 lbs. of thebaine to the Central Laboratories for research on metapon synthesis ; (*iii*) The Director, Central Laboratories informed that an order for the supply of fructose had been received from England. He was in correspondence with local firms to take up the processes evolved in the Central Laboratories. The Secretary, Commerce & Industries Department, desired that details of the scheme on pilot plant preparation of fructose may be sent to him to enable him to take up the matter with the Board of Directors of Biochemical & Synthetic Products Ltd., or Hyderabad Chemical and Pharmaceutical Works Ltd.; (*iv*) The Secretary, Commerce & Industries Department, desired that a copy of the scheme for pilot plant work on Lactic Acid by Fermentation of Molasses, from the Nizam Sugar Factory, Bhodan, may be sent to him. The matter would be taken up in the next meeting of the Board of Directors of their Sugar Factory.	3. p. 297. The Committee noted.	3. p. 297. The Board noted.
	4. PROCEEDINGS OF THE RESEARCH COMMITTEES : The Board approved the continuance of the following schemes under the various Research Committees : (A) *Vegetable Oils Utilisation Committee* : (*i*) Investigation of toxic principle of custard apple seed oil, (*ii*) Preparation of dehydrated castor oil on pilot plant scale, (*iii*) Utilisation of dehydrated castor oil for surface		

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	coatings, dimer acids etc., (*iv*) Products from castor oil, (*v*) Activation of Hyderabad earth for bleaching purposes, (*vi*) Examination of cotton seeds, (*vii*) Separation of fatty acids by (a) urea method (b) amide method, (*viii*) Sugar-cane wax, and (*ix*) Enzyme splitting of fats. (B) *Heavy Chemicals Committee* : (*i*) Utilisation of iron pyrites, (*ii*) Utilisation of felspar, (*iii*) Preparation of active charcoal from indigenous materials, (*iv*) Utilisation of various sulphates for the preparation of sulphur compounds, (*v*) Methods for manufacture of phosphate fertilisers with a view to conserve sulphuric acid, & (*vi*) Recovery of titanium and titanium dioxide from the sludge left after the preparation of aluminium sulphate from bauxite. (C) *Ceramic Research Committee* : (*i*) Systematic study of Hyderabad clays, (*ii*) Preparation of refractories from locally available materials, & (*iii*) Manufacture of clinker lime sludge bricks. The following new schemes were added to the research programme :— (*i*) X-ray study of Hyderabad clay, (*ii*) Setting of differential thermal analysis apparatus and (*iii*) Investigation of various river sands for preparation of lime motrars. The Board endorsed the following resolution of the Ceramic Research Committee adopted at its meeting held on 9-12-1952 : "In view of the importance of co-ordinated and planned development of the ceramic industry in the country, the Government of India be requested to constitute a Working Party (Operational Research Unit) for the Ceramic Industry with the following terms of reference :— (*i*) to assess the country's resources in regard to the raw materials available for the industry ; (*ii*) to assess the potentialities of the existing industries to meet the requirements of the nation and to suggest such aids or relief as may be conducive to their further growth ; (*iii*) to examine the need and availability of the technical talent for ceramic industries in the country and offer suitable suggestions thereon ; and (iv) to indicate the lines on which the ceramic industries practised on a cottage industry basis could be developed. The working party thus envisaged may serve as a pointer to the steps which should be adopted in the Nation's interest to strengthen the ceramic industries both on a large scale as

Recommendations of the Committee of the Board.	*Recommendations of the Board.*

Item No.	*Particulars.*	*Recommendations of the Committee of the Board.*	*Recommendations of the Board.*
	well as on a cottage industry basis and to render them more stable and more capable of meeting competition." (D) *Fuel Committee* : (*i*) Low temperature carbonisation of Hyderabad coal, (a) analysis and study of the products of carbonisation, (b) distillation of low temperature tar, (c) solvent extraction of tar acids from tar oil, (d) solvent extraction of tar acids from ammoniacal liquor, and (e) benzol recovery from the low temperature gas; (ii) Fluidized carbonisation of Hyderabad coal, (iii) Briquetting of coal (financed by CSIR), (iv) Washability of Hyderabad coal (to be undertaken if the Singareni Colleries Co. is interested) and (v) Systematic survey of coal resources of Hyderabad State (to be undertaken if the CSIR finances the scheme). (E) *Pilot Plant Committee* : (*a*) Subsidised Schemes : (i) Low temperature carbonisation of coal, (ii) Washability of coal, (iii) Briquetting of coal, (iv) Hand-made paper, and (v) Cotton seed processing. (*b*) Non-subsidised Schemes : (i) Dehydration of castor oil, (ii) Fructose from cane sugar, (iii) Calcium lactate by fermentation of molasses, (iv) Fluidisation of coal, (v) Refining of palmarosa oil, (vi) Lignin & its utillsation, (vii) Isolation of sesamin, (viii) Potash from felspar, (ix) Sand lime bricks and (x) Activation of Hydrabad earths. (F) *Fibre Research Committee* : (*i*) Investigation of cotton linters and casurina pulp for preparation of cellulose acetate rayon, (*ii*) Preparation of hand-made paper from rags, cotton and hoseiry waste and waste cotton, (*iii*) Preparation of lignin from bamboo, & (*iv*) investigation of cotton dust for rayon manufacture. (G) *Industrial Ferments Committee* : (*i*) Preparation of citric acid from molasses, (*ii*) Preparation of itaconic acid from molasses, (*iii*) Investigation of fusel oil (change of composition on storage), (*iv*) Pilot plant experiments on the production of calcium lactate by the fermentation of molasses, (*v*) Laboratory experiments on the preparation of food yeast, & (*vi*) Pilot plant experiment on the preparation of levulinic acid and calcium levulinate.		

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	(H) *Pharmaceutical and Drugs Committee* : (*i*) Synthesis of analgesics, pethidine, metapon and quinazolinole, (*ii*) Preparation of compounds from brucine possessing enhanced physiological activity, (*iii*) Preparation of oestrogenic stilbene derivatives, (*iv*) Preparation of menthol from Indian turpentine, and (*v*) Chlorination of Indian turpentine. (I) *Forest Products Utilisation Committee* : (*i*) Investigation of (*a*) custard apple seed, (*b*) gum of *Boswellia serrata*, & (c) gum of *Sterculia urens* ; (*ii*) Study of the biology of Tussar silk worm and the control of its diseases with the object of reviving the tussar silk industry, (*iii*) Rearing eri silk work on castor leaf ; (*iii*) Assay of *Accacia sundra*.	4. p. 297-303 The Committee noted that departmental action had been taken to obtain the comments of the concerned National Laboratories and C.S.I R. Research Committees on the research programmes of the Hyderabad B.S.I.R. and these would be communicated to the Hyderabad Board with a view to avoiding duplication in these programmes. As regards the constitution of a Working Party for the Ceramic Industry, the Committee thought that considerable data on the industry had already been collected by the Development Panel of the Ministry of Commerce and Industry, the Planning Commission, the Central Glass and Ceramic Research Institute, and the Glass & Refractories Research Committee. The Committee, therefore, recommended that the comments of these bodies be obtained on the suggestion of the Hyderabad Board and communicated to the Ministry of Commerce & Industry and the B.S.I.R., Hyderabad.	4. p. 297-303. The Board noted and endorsed the recommendations of its Committee.

Item No.	Particulars.	Recommendations of the Committee of the Board.	Recommendations of the Board.
LXVIII.	*Subject* :—**Investigations of Lunar & Solar Tides in the Ionosphere by Mr. B. M. Banerjee and Mr. R. Roy, Institute of Nuclear Physics, Calcutta.** *Object and Scope* : The object of this scheme is (*i*) to build an improved ionospheric recorder with high resolving power, and (*ii*) to investigate with its help the lunar and solar tides of the ionosphere. It has been observed that in the atmosphere the solar tides instead of being smaller are about 100 times stronger than the lunar tides. Taylor and Pekeris have shown that solar tidal oscillations are greatly augmented by resonance due to one of the modes of oscillation of the atmosphere which has a period of 12 hours. Appleton and Weeks have demonstrated the existence of lunar tidal effect in the E-region of the ionosphere. They found a semi-diurnal oscillation of the height of the E-layer from data recorded at the Ionospheric Station of the Radio Research Board, England, but certain discrepancies have been found between the British results and the Australian results obtained at Sydney. Martyn has tried to explain the discrepancies with the help of his electro dynamical theory of tides in the ionosphere. But the height variations being small (only of the order of 1/2 k. m.) it is difficult to check the theory of Martyn or to make a comparative study of the results of Appleton and Martyn particularly with regard to lunar tidal effects in the E-layer. Dr. Banerjee has developed an ionospheric recorder which utilises 50 k.w. pulses and which can measure heights up to an accuracy of ± 1/10 k. m. Prof. Appleton has suggested that the problems of solar and lunar tides in the ionosphere so far investigated without conclusive results, may be investigated by this apparatus. The lunar tidal effect, though small, is easier to analyse as it is not effected by the semi-diurnal ionizing effect of solar radiation. Solar tidal effects in the F layer at Calcutta have already been deduced by the research group under Dr. S K. Mitra. The work will be carried out under the joint auspices of the Institute of Nuclear Physics (Hon. Director Prof. M.N. Saha) and the Institute of Radio Physics & Electronics (Prof. S.K. Mitra, Head of the Department). *Duration* : Three years—To be completed before the next Geophysical year (1957-58).		

LATE ITEMS—RESEARCH SCHEME.

Item No.	Particulars	Recommendations of the Committee of the Board.	Recommendations of the Board.
	Grant asked for : Equipment ... Rs. 20,000 (One high resolution improved recorder, one camera for automatic range vs. time recorders, electric twin recording arrangement, double beam oscilloscope). Contingencies ... Rs. 1,000 Staff : .. Rs. 9,075 (including allowances. (1 S. R. A., 1 J. R. A., 1 Mechanic, 1 J. L. A., and 1 Bearer). Total Rs. 30,075 (including allowances.	LXVIII. p. 305-307 The Committee recommended that the Research Scheme be referred to the Radio Research Committee for opinion.	LXVIII. p. 305-307. The Board endorsed the recommendation of its Committee.
LXIX.	Dr. Sivatosh Mookerjee, Cell Research Unit, Chittaranjan Cancer Hospital, Calcutta, ha sent the following application : I have been working since last January 1952 on a research programme of I.C.I. (India) o the Cytochemical basis of animal morphogenesis. At this stage of my work, I am very much in need of a micro-manipulator to procee further into the problem. I have enquired the cost of this apparatus which is approximatel Rs. 12,000. This is a very big sum of money for us and we cannot afford to get it. Can you b kind enough to consider for a special grant towards the purchase of this apparatus for us ?	LXIX. p. 307. The Committee recommended an equipment grant of Rs. 12,000 to Dr. Sivatosh Mookerjee for the purchase of a Micro-Manipulator.	LXIX. p. 307. The Board endorsed the recommendation of its Committee.

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