

Proceedings of the 29th
Meeting of the Board of Scientific
& Industrial Research, August, 12, 1957

EB 124568



Ready
1-10-52

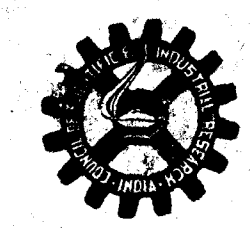
For Members only.

360

Proceedings
OF THE 29th MEETING OF THE
Board of Scientific & Industrial Research



R3 R118



R 12-H 33.27
F-2-89
15-24

AUGUST 12, 1952

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. J.W. McBain, F.R.S.
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.	"	Dr. J.W. McBain, F.R.S.
20. Vanaspathi 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 Thorla.
24. Leather Research Committee.	"	Mr. B. M. Das.

40
1952 Ix H 2320

COMMITTEE OF THE BOARD OF SCIENTIFIC & INDUSTRIAL RESEARCH

A meeting of the Committee of the Board was held at 10 00 a. m. on Monday, the 11th August, 1952 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. K. A. Hamied	"
Dr. J. N. Mukherjee	"
Dr. D. N. Wadia	"
Dr. S. Krishna	(Deputy D.S.I.R. Tech.)
Mr. R. P. Bahadur	(Secretary C.S.I.R.)

The Agenda for the 29th meeting of the Board of Scientific and Industrial Research was discussed and recommendations were made.

BOARD OF SCIENTIFIC & INDUSTRIAL RESEARCH

The 29th Meeting of the Board of Scientific and Industrial Research was held on Tuesday, the 12th August 1952 at 3-00 p.m. in New Delhi. Shri Jawaharlal Nehru presided and the following were present :—

Maulana Abul Kalam Azad	(Vice-President, C.S.I.R.)
Dr. S. S. Bhatnagar	(D.S.I.R.)
Lala Shri Ram	(Chairman of the Committee)
Shri A. Ramaswami Mudaliar	(Member)
Dr. J. C. Ghosh	"
Prof M. S. Thacker	"
Shri Kasturbhai Lalbhai	"
Prof. M. N. Saha	"
Dr. K. A. Hamied	"
Dr. D. N. Wadia	"
Dr. J. N. Mukherjee	"
Dr. S. Krishna	(Deputy D.S.I.R. Tech.)
Shri R. P. Bahadur	(Secretary C.S.I.R.)

The President welcomed Maulana Abul Kalam Azad the new Vice-President of the Board. He referred to the fact that the Ministry of Natural Resources and Scientific Research and the Ministry of Education were now under one Minister. Dr. S. Krishna the new Deputy D.S.I.R. (Tech.) was introduced.

After considering the agenda placed before the Board, the President referred to the Food Adulteration Bill under the consideration of the Government. The bill has envisaged the establishment of a Food Testing Laboratory. The President invited the opinion of the members on that suggestion. The consensus of opinion was that there were already laboratories existing in various centres such as Central Food Technological Research Institute at Mysore, National Chemical Laboratory at Poona and the Central Drug Research Institute at Lucknow whose facilities could be utilised for this purpose and if need be expanded and there was no need of a separate testing laboratory for food.

Proceedings of the XXIX meeting of the Board of Scientific and Industrial Research
held on the 12th August, 1952.

Item No.	Subject.	Reference to page in the Proceedings.
I.	Confirmation of the proceedings of the 28th meeting of the Board of Scientific and Industrial Research held on the 19th March, 1952.	I
	Research Schemes :	
II.	Research scheme on molecular spectra in visible and ultraviolet regions by Dr. K. Majumdar, Reader in Physics, Allahabad University.	I
III.	Research scheme on spectral studies of heterocyclic aromatic compounds by Dr. M. R. Padhye, Lecturer in Colour Physics, Bombay University.	I
IV.	Research scheme on development of microwave technique and its applications by Dr. K. Rangadhama Rao, Andhra University, Waltair.	3
4568 V.	Research scheme on further studies on refractor by Dr. S. S. Joshi, Head of the Chemistry Department, Meerut College, Meerut.	5
VI.	Research scheme on systematic survey of coalfields of Hyderabad State by the Director, Central Laboratories for Scientific and Industrial Research, Hyderabad Dn.	7
VII.	Research scheme on power gas from vegetable refuse and low grade coal by Prof. V.T. Krishnan, New Engineering College, Sangli.	11
VIII.	Research scheme on synthetic petrol by Fischer-Tropsch process by Dr. G. C. Basak and Shri N. C. Neogy, Bengal Engineering College, Howrah.	13
IX.	Research scheme on Palynology by Director, Birbal Sahni Institute of Palaeobotany, Lucknow.	13
X.	Research scheme on flora of Delhi State by Dr. P. Maheshwari, Head of the Botany Department, Delhi University.	17
XI.	Research scheme on the physiological and chemical changes in fruits and vegetables by Dr. J. K. Chowdhury, Prof. of Botany, Presidency College, Calcutta.	19
XII.	Research scheme on a new variety of food yeast by Dr N. R. Dhar, Director, Sheila Dhar Institute of Soil Science & Head of the Chemistry Department, Allahabad University.	23
XIII.	Research scheme on Indian cardiac drugs by Prof. S. Rangaswami, Head of the Department of Pharmacy, Andhra University, Waltair.	23
XIV.	Research scheme on availability of calcium from Indian foodstuffs in cases of osteoporosis and osteomalacia by Dr. B. N. Sinha, Head of Dept. of Orthopaedic Surgery, King George's Medical College, Lucknow and Orthopaedic Surgeon, Gandhi Memorial Hospital, Lucknow.	25
XV.	Research scheme on chemical investigation of the unsaponifiable matter in Indian edible oils with special reference to steroid fractions by Dr. A. Tyabji, Ph.D. (Zurich), A.R.I.C., Bombay.	27
XVI.	Revision of Bulletin No 10-Indian Vegetable Oils by the Director, N.C.L.	29
XVII.	Research scheme on manufacture & utilisation of cellulose ethers and esters by the Director, National Chemical Laboratory, Poona.	29

ii

Item No.	Subject.	Reference to page in the Proceedings.
XVIII.	Research scheme on manufacture of unbreakable glass tumblers by Dr. R. Charan, Head of the Department of Glass Technology, Banaras Hindu University.	33
XIX.	Research scheme on the manufacture of thermos flasks by Dr. R. Charan, Head of the Department of Glass Technology, Banaras Hindu University.	35
XX.	Training in Statistical Quality Control by Prof. P. C. Mahalanobis, F. R. S.	37
	Proceedings of Research Committees :	
XXI.	Proceedings of the Sub-Committee on Co-ordination and Publication of Ionospheric Data (Radio Research Committee : Chairman Dr. K.S. Krishnan).	39
XXII.	Proceedings of the Plastics Research Committee (Chairman : Dr. L. C. Verman)	41
XXIII.	Proceedings of the Mining Research Committee (Convenor : Dr. J. W. Whitaker.)	55
XXIV.	Proceedings of the Internal Combustion Engines Research Committee (Chairman : Dr. J. C. Ghosh)	77
XXV.	Proceedings of the Gas Turbine Sub-Committee. (Chairman : Dr. J.C. Ghosh)	89
XXVI.	Proceedings of the Coal Blending & Coking Research Sub-Committee (Chairman : Mr. S. K. Nanavati).	95
XXVII.	Proceedings of the B.S.I.R. Hyderabad (Dn.)	101
XXVIII.	Any other business.	111
	Supplementary Items :	
XXIX.	Proposal from Dr K.A. Hamied.	113
XXX.	A NOTE on the scope and functions of the Central Building Research Institute by the Director, Central Building Research Institute.	117
XXXI.	Proceedings of the Salt Research Committee (Chairman : Dr. Mata Prasad).	121

SEARCH SCHEMES

Item No.	Particulars												
I	Confirmation of the proceedings of the 28th meeting of the Board of Scientific and Industrial Research held on the 19th March, 1952.												
II	Subject : Research scheme on molecular spectra in visible and ultraviolet regions by Dr. K. Majumdar, Reader in Physics, Allahabad University. <i>Note :</i> 1. The investigator proposes to study the spectra of both diatomic and polyatomic molecules. Molecular spectra throw considerable light on molecular structure and their constants can be determined with greater accuracy than by other methods. An appreciable amount of work has been done in India on diatomic molecules but there is vast scope for further work. Work in this field is already under-way in the Allahabad University. Most of the equipment is available. 2. The following grant is required for the first year :— <table><tr><td>Equipment (1 H. T. transformer)</td><td>...</td><td>Rs. 500</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 500</td></tr><tr><td>Staff : (One J.S.A. on Rs. 200)</td><td></td><td>Rs. 3,120 (including allowances)</td></tr><tr><td>Total</td><td></td><td>Rs. 4,120 (including allowances)</td></tr></table> 3. The scheme has been referred to the Physical Research Committee for opinion.	Equipment (1 H. T. transformer)	...	Rs. 500	Contingencies	...	Rs. 500	Staff : (One J.S.A. on Rs. 200)		Rs. 3,120 (including allowances)	Total		Rs. 4,120 (including allowances)
Equipment (1 H. T. transformer)	...	Rs. 500											
Contingencies	...	Rs. 500											
Staff : (One J.S.A. on Rs. 200)		Rs. 3,120 (including allowances)											
Total		Rs. 4,120 (including allowances)											
III	Subject : Research scheme on spectral studies of heterocyclic aromatic compounds by Dr. M. R. Padhye, Lecturer in Colour Physics, Bombay University. <i>Note :</i> 1. The work proposed to be done can be divided into two parts. The first part consists in determining the ultraviolet and visible absorption spectra in solution of the heterocyclic aromatic compounds consisting of five membered and if possible six membered heterocyclic rings, e.g. thionaphthene, dibenzthiophene, furan, benzofuran, pyrrole, benzpyrrole, penthiophene, γ-pyran, etc. The study of this type together with the data from the second part is expected to elucidate the effect of the hetero atom substitution in the aromatic ring, especially when the data about the five membered ring system is compared with those of the corresponding six membered ring and parent hydrocarbons and also with that when it is conjugated to a phenyl												

Recommendations of the Committee of the Board.	Recommendations of the Board.								
Page 1 <i>Item I p. 1.</i> The Committee noted that the proceedings of the 28th Meeting of the Board had already been circulated to the members and no member had raised any point which required discussion. The Committee therefore recommended that the proceedings of the 28th meeting of the Board be confirmed. <i>Item II p. 1.</i> The Committee noted that the opinion of the Physical Research Committee was that (i) the scheme fell within the normal functions of a University Laboratory (ii) important aspects of molecular spectra were under investigation in a scheme by Prof. Asundi of the Banaras Hindu University and no new line of attack was proposed. While appreciating the views of the Research Committee, the Committee felt that there was a great paucity of funds for research in the universities and they deserved support even in small schemes. The Committee also felt that the field of research in molecular spectra was wide and the research scheme by Dr. Majumdar be sanctioned subject to the condition that a revised programme of work co-ordinated with that of Prof. Asundi was drawn up. It was recommended that the following grant be sanctioned (upto 31st March 1953 in the first instance):— <table><tr><td>Equipment.</td><td>Rs. 500</td></tr><tr><td>Contingencies.</td><td>Rs. 250</td></tr><tr><td>Staff : (One J.S.A. on Rs. 200/-)</td><td>Rs. 1,560 (including allowances)</td></tr><tr><td>Total</td><td>Rs. 2,310 (including allowances)</td></tr></table>	Equipment.	Rs. 500	Contingencies.	Rs. 250	Staff : (One J.S.A. on Rs. 200/-)	Rs. 1,560 (including allowances)	Total	Rs. 2,310 (including allowances)	Page 1. <i>Item I p. 1.</i> The Board confirmed the proceedings of the 28th meeting held on the 19th March, 1952. <i>Item II p. 1.</i> The Board agreed with the views of its Committee and endorsed the recommendations.
Equipment.	Rs. 500								
Contingencies.	Rs. 250								
Staff : (One J.S.A. on Rs. 200/-)	Rs. 1,560 (including allowances)								
Total	Rs. 2,310 (including allowances)								

RESEARCH SCHEMES

Item No.	Particulars.								
	ring. This study will throw light on the long wavelength singlet-triplet transitions which are usually of two types in heterocyclic molecules. The second part of the work consists in studying the ultraviolet vapour absorption and emission spectra of the above mentioned heterocyclic compounds. The vapour absorption together with emission brings out the vibrational structure of both the ground and the excited states. This may throw light on the nature of the excited electronic levels in the parent hydrocarbons which is a very controversial point for the present and also will show the nature of perturbation introduced by the hetero atom. These studies would also reveal the amount of aromaticity or more precisely the extent of homocyclic conjugation introduced by the hetero atoms S, O and N. It would be very interesting to study this in the five as compared with the six membered ring with the same atom. Dr. Padhye has already carried out some work in this regard. The proposed scheme is of fundamental and academic value and may take several years for completion. The general basic work may however be completed in two years. 2. The following grant has been asked for during the first year :— <table><tr><td>Equipment</td><td>... Nil</td></tr><tr><td>Contingencies</td><td>... Rs. 2,000</td></tr><tr><td>Staff (Two Junior Scientific Assistants)</td><td>... Rs. 6,120 (including allowances)</td></tr><tr><td>Total</td><td>Rs. 8,120 (including allowances)</td></tr></table> 3. The scheme has been referred to the Physical Research Committee for opinion.	Equipment	... Nil	Contingencies	... Rs. 2,000	Staff (Two Junior Scientific Assistants)	... Rs. 6,120 (including allowances)	Total	Rs. 8,120 (including allowances)
Equipment	... Nil								
Contingencies	... Rs. 2,000								
Staff (Two Junior Scientific Assistants)	... Rs. 6,120 (including allowances)								
Total	Rs. 8,120 (including allowances)								
IV	Subject : Research scheme on development of microwave technique and its applications by Dr. K. Rangadhama Rao, Andhra University, Waltair. Note : 1. On account of its enormous frequency resolving power, microwave spectroscopy has recently become one of the principal tools in the study of problems relating to molecular structure, nuclear spin, dipole moments, nuclear quadpole moments, exchange of rotational energy on collision etc. Under this scheme it is proposed to take up (a) measurement of dielectric constant and power factor of solids over wide range of frequencies and temperatures (60-1500 Mcs/sec. and from								

Recommendations of the Committee of the Board.	Recommendations of the Board.								
Page 3 Item III p. 1-3. The Committee noted that the following opinion of the Physical Research Committee had since been received. "A similar scheme is already under investigation by Prof. Asundi. It is not considered appropriate that Dr. Padhye should be provided with two research assistants for work which he could very well carry out personally. The scheme is not recommended." In view of the fact that there was acute shortage of funds in the universities, the Committee recommended that the following grant be made to Dr. Padhye provided a revised scheme was submitted with a modified programme after discussion with Dr. Venkataraman and Prof. Asundi (upto 31st March 1953 in the first instance) : <table> <tr> <td>Equipment</td><td>Nil.</td></tr> <tr> <td>Contingencies.</td><td>Rs. 500</td></tr> <tr> <td>Staff : (One Junior Scientific Assistant on Rs. 200/-)</td><td>Rs. 1,770 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 2,270 (including allowances)</td></tr> </table>	Equipment	Nil.	Contingencies.	Rs. 500	Staff : (One Junior Scientific Assistant on Rs. 200/-)	Rs. 1,770 (including allowances)	Total	Rs. 2,270 (including allowances)	Page 3. Item III p.1-3. The Board endorsed the recommendation of its Committee.
Equipment	Nil.								
Contingencies.	Rs. 500								
Staff : (One Junior Scientific Assistant on Rs. 200/-)	Rs. 1,770 (including allowances)								
Total	Rs. 2,270 (including allowances)								

RESEARCH SCHEMES

Item No.	Particulars.																
	liquid air temperature upto 250°C) ; (b) verification of the theory of Gevers and Dupre on the relation between loss factor and temperatures at higher frequencies than has been done up till now (the above theory is verified upto 40 Mcs only) ; (c) investigation of the dielectric properties of organic long chain compounds with particular reference to transitional stages (i.e. solid to liquid transition) ; (d) investigation of the radio frequency absorption spectra of solutions of electrolytes in the above said frequency ranges ; and (e) study of pure rotation spectra of some organic molecules at microwave frequency particularly in the range of 18-27 Kmc/sec.																
	The laboratory has already got some equipment and more has been ordered and is also under construction. Some additional equipment is required.																
	2. The following grant is needed :																
	<table><tr><td>Equipment (Dielectric test set, wave guides and attenuations etc).</td><td>...</td><td>Rs. 30,000</td><td></td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 3,000</td><td></td></tr><tr><td>Staff (One Junior Res. Asst. on Rs. 160 p.m. one Lab. Asst. on Rs. 100 p.m. and One Mechanic on Rs. 50 p.m.)</td><td>...</td><td>Rs. 5,940</td><td>(including allowances)</td></tr><tr><td></td><td>Total</td><td>Rs. 38,940</td><td>(including allowances)</td></tr></table>	Equipment (Dielectric test set, wave guides and attenuations etc).	...	Rs. 30,000		Contingencies	...	Rs. 3,000		Staff (One Junior Res. Asst. on Rs. 160 p.m. one Lab. Asst. on Rs. 100 p.m. and One Mechanic on Rs. 50 p.m.)	...	Rs. 5,940	(including allowances)		Total	Rs. 38,940	(including allowances)
Equipment (Dielectric test set, wave guides and attenuations etc).	...	Rs. 30,000															
Contingencies	...	Rs. 3,000															
Staff (One Junior Res. Asst. on Rs. 160 p.m. one Lab. Asst. on Rs. 100 p.m. and One Mechanic on Rs. 50 p.m.)	...	Rs. 5,940	(including allowances)														
	Total	Rs. 38,940	(including allowances)														
	3. The scheme has been referred to the Physical Research Committee and the Radio Research Committee for opinion.																
V	Subject : Research scheme on further studies on refrachor by Dr. S. S. Joshi, Head of the Chemistry Department, Meerut College, Meerut. <i>Note :</i> 1. The aim of the scheme is to develop a physical constant which could help in the elucidation of structure of compounds. On the basis of a detailed study of the available data on a large number of compounds it is found that physical constants like parachor, molecular refraction etc. have their limitations. A new constant, for which the name REFRACTOR (F) is proposed, has been found superior to other constants. $(F) = -P \log (n_d^{20} - 1)$ where P is Parachor, and n_d^{20} is refractive index at 20°C. It is strictly additive in character and depends on the atoms present and their method of linkage. From a study of data for over 600 compounds it has been found that both theoretically calculated and experimentally determined values of Refrachor from surface tension, density and refractive																

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 5. <i>Item IV p. 3-5.</i> The Committee noted that the Chairman of the Physical Research Committee had desired further information from Dr. Rangadhama Rao and that he had been requested to furnish this information. The Committee recommended that the advice of the Chemical Research Committee be also obtained with regard to (c) and (d) of the programme of research indicated. It was also recommended that the D.S.I.R. be authorised to take necessary action departmentally when the considered opinion of the Physical and Radio and Chemical Research Committees was available.	Page 5. <i>Item IV p. 3-5.</i> The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars.												
	index are remarkably constant. The constant has been employed for determination of structure in some cases and has given good results. Its use could be extended. The experimental data used so far has been mostly that determined by other workers and reported in literature. The investigator now proposes to determine this data in his own Laboratory. 2. The following grant has been asked for during the first year : <table><tr><td>Equipment (Refractrometer reading upto 5th place)</td><td>...</td><td>Rs. 4,000</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 1,000</td></tr><tr><td>Staff (One Junior Research Assistant on Rs. 160/- p.m.)</td><td>...</td><td>Rs. 2,640 (including allowances)</td></tr><tr><td>Total</td><td></td><td>Rs. 7,640 (including allowances)</td></tr></table> 3. The scheme has been referred to the Chemical Research Committee for opinion.	Equipment (Refractrometer reading upto 5th place)	...	Rs. 4,000	Contingencies	...	Rs. 1,000	Staff (One Junior Research Assistant on Rs. 160/- p.m.)	...	Rs. 2,640 (including allowances)	Total		Rs. 7,640 (including allowances)
Equipment (Refractrometer reading upto 5th place)	...	Rs. 4,000											
Contingencies	...	Rs. 1,000											
Staff (One Junior Research Assistant on Rs. 160/- p.m.)	...	Rs. 2,640 (including allowances)											
Total		Rs. 7,640 (including allowances)											
VI	Subject:—Research scheme on systematic survey of coalfields of Hyderabad State by the Director, Central Laboratories for Scientific and Industrial Research, Hyderabad Dn. <i>Note :—</i> 1. The object of this scheme is to set up a coal survey station at the Central Laboratories for Scientific and Industrial Research, Hyderabad for the systematic survey of the coalfields of Hyderabad State. These coalfields produce about one million tons of coal annually and occupy a strategic position being the only suppliers of coal in South India. The coalfields that are at present being worked are :— <table><tr><td>(a)</td><td>Singareni collieries</td><td>(commenced mining in 1889)</td></tr><tr><td>(b)</td><td>Tandur</td><td>„ („ „ 1928)</td></tr><tr><td>(c)</td><td>Kothagudium</td><td>„ („ „ 1937)</td></tr><tr><td>(d)</td><td>Sasti</td><td>„ („ „ —)</td></tr></table> In addition virgin reserve coalfields remain untapped at Chinnur, Ramaram, Allapulli, Sivawaram, Madavaram and elsewhere.	(a)	Singareni collieries	(commenced mining in 1889)	(b)	Tandur	„ („ „ 1928)	(c)	Kothagudium	„ („ „ 1937)	(d)	Sasti	„ („ „ —)
(a)	Singareni collieries	(commenced mining in 1889)											
(b)	Tandur	„ („ „ 1928)											
(c)	Kothagudium	„ („ „ 1937)											
(d)	Sasti	„ („ „ —)											

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 7. Item V p. 5-7. The Committee noted that the opinion of the Chemical Research Committee was not yet available. It was recommended that (i) the Research Committee be requested to expedite consideration of the scheme, (ii) the D.S.I.R. be authorised to take necessary action departmentally as soon as the recommendation of the Research Committee was received.	Page 7. Item V p. 5-7. The Board noted and endorsed the recommendations of its Committee.

RESEARCH SCHEMES

Item No.	Particulars.								
	The only comprehensive information regarding coal resources of Hyderabad State is from Dr. C.S. Fox's Memoir (G.S.I. Vol. LIV), who computed the total coal reserves of India at about 80,000 million tons, the Wardha-Godavari Warora area contributing 18000 million tons. This estimate is by no means comprehensive and admits further systematic survey. The results of qualitative analysis carried out so far on random samples from Hyderabad coalfields, both in India and abroad, are of little or no help in the classification, conservation and efficient utilisation of these coals. The Fuel Research Committee of the C.S.I.R. considering the importance of systematic survey of coals, had opened five survey stations in different parts of India. Work on a moderate scale was also started in 1951 on a survey of Hyderabad coals with a grant of Rs. 14,000 by the Industrial Trust Fund (Hyderabad), and about ten coal samples from different parts of the seam at Kothagudium were analysed completely according to the methods followed by the Fuel Research Institute, with the assistance of a nucleus staff consisting of a geologist and a research assistant. With this meagre staff it is not possible to get more analyses done and unless these analyses are carried out at a more rapid rate the results achieved so far will lose their value and the purpose of the survey will be lost. The Government of Hyderabad and the Industrial Trust Fund are not only unable to extend the staff but may not be able to continue present staff and the detailed survey of these nationally important coals may not be done. It is proposed to locate the survey station at the Central Laboratories for Scientific and Industrial Research, Hyderabad Dn., where necessary facilities are available. The survey for these coalfields may take five years. The scheme may be sanctioned for three years in the first instance. The position may be reconsidered after that period. 2. The following grant has been asked for the first year : <table><tr><td>Equipment (including one jeep car)</td><td>Rs. 24,000</td></tr><tr><td>Contingencies (Printing of reports and T.A.)</td><td>... Rs. 8,000</td></tr><tr><td>Staff (2 Geologists and 4 Chemists, 3 Lab. Assts., 2 Lab. Bóys, 6 Kamaties.)</td><td>.. Rs. 32,472 (including allowances)</td></tr><tr><td>Total</td><td>Rs. 64,472 (including allowances)</td></tr></table> Note:—The scales of pay for staff are calculated on Hyderabad Govt. scales 3. The scheme has been referred to the Fuel Research Committee for opinion.	Equipment (including one jeep car)	Rs. 24,000	Contingencies (Printing of reports and T.A.)	... Rs. 8,000	Staff (2 Geologists and 4 Chemists, 3 Lab. Assts., 2 Lab. Bóys, 6 Kamaties.)	.. Rs. 32,472 (including allowances)	Total	Rs. 64,472 (including allowances)
Equipment (including one jeep car)	Rs. 24,000								
Contingencies (Printing of reports and T.A.)	... Rs. 8,000								
Staff (2 Geologists and 4 Chemists, 3 Lab. Assts., 2 Lab. Bóys, 6 Kamaties.)	.. Rs. 32,472 (including allowances)								
Total	Rs. 64,472 (including allowances)								

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 9. Item VI p. 7-9. The Committee noted that the Chairman of the Research Committee had informed that the scheme would be discussed at the next meeting of the Fuel Research Committee in detail. 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, it was recommended that the scheme be brought before the Board at its next meeting along with the recommendation of the Fuel Research Committee.	Page 9. Item VI p. 7-9. The Board noted and endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars.																									
VII	Subject : Research scheme on power gas from vegetable refuse and low grade coal by Prof. V.T. Krishnan, New Engineering College, Sangli. <i>Note :</i> 1. The aim of the scheme is to gasify (i) any vegetable refuse matter and (ii) slack coal and such other low calorific value fuels; and use the gas formed for generation of power in modern internal combustion engines and if possible in gas turbines. It is proposed to carry out work in the following four stages : — <i>Stage I.</i> Production of gas from small experimental producer, measuring its calorific value, tar content etc., fixing up the position of gas outlet from the producer for best results. <i>Stage II.</i> Building a small producer and trying the gas produced in an engine and a compressor under varying conditions to explore roughly its burning and pre-ignition qualities. <i>Stage III.</i> Study of the behaviour of the gas in a variable compression engine specially rigged up for analysis of burnt gases inside the cylinder (by arrangement for spectrum and by tapping at various points) ; to determine the best shape of the cylinder head for all types of ignition, to measure the velocity of combustion of gas in the cylinder head, with a view to use the gas in a gas turbine. <i>Stage IV.</i> Study the possibility of using the gas in gas turbines. 2. The grant asked for under each stage with approximate duration of work are given below : <table><tr><th></th><th>Stage I (duration 7 months)</th><th>Stage II (duration 8 months)</th><th>Stage III (duration 15 months)</th><th>Total</th></tr><tr><td>Equipment</td><td>Rs. 9,000 (Bomb & gas calorimeters, blowers, motor, retorts, producer etc.)</td><td>Rs. 14,000 (Small size producer & compressor with accessories).</td><td>Rs. 75,000 (Special variable compressor type engine).</td><td>Rs. 98,000</td></tr><tr><td>Contingencies</td><td>Rs. 2,000</td><td>Rs. 2,000</td><td>Rs. 7,000 (including spares)</td><td>Rs. 11,000</td></tr><tr><td>Staff</td><td>Rs. 1,000 (mostly labour)</td><td>Rs. 2,000 (mostly mechanical labour)</td><td>Rs. 3,000 (Technically skilled labour).</td><td>Rs. 6,000</td></tr><tr><td></td><td></td><td></td><td>Total</td><td>Rs. 1,15,000</td></tr></table> Estimates will be given later for the IV stage. 3. The scheme has been referred to the Fuel Research Committee for opinion.		Stage I (duration 7 months)	Stage II (duration 8 months)	Stage III (duration 15 months)	Total	Equipment	Rs. 9,000 (Bomb & gas calorimeters, blowers, motor, retorts, producer etc.)	Rs. 14,000 (Small size producer & compressor with accessories).	Rs. 75,000 (Special variable compressor type engine).	Rs. 98,000	Contingencies	Rs. 2,000	Rs. 2,000	Rs. 7,000 (including spares)	Rs. 11,000	Staff	Rs. 1,000 (mostly labour)	Rs. 2,000 (mostly mechanical labour)	Rs. 3,000 (Technically skilled labour).	Rs. 6,000				Total	Rs. 1,15,000
	Stage I (duration 7 months)	Stage II (duration 8 months)	Stage III (duration 15 months)	Total																						
Equipment	Rs. 9,000 (Bomb & gas calorimeters, blowers, motor, retorts, producer etc.)	Rs. 14,000 (Small size producer & compressor with accessories).	Rs. 75,000 (Special variable compressor type engine).	Rs. 98,000																						
Contingencies	Rs. 2,000	Rs. 2,000	Rs. 7,000 (including spares)	Rs. 11,000																						
Staff	Rs. 1,000 (mostly labour)	Rs. 2,000 (mostly mechanical labour)	Rs. 3,000 (Technically skilled labour).	Rs. 6,000																						
			Total	Rs. 1,15,000																						

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 11. <i>Item VII p. 11.</i> The Committee noted that the Chairman had since communicated that the Research Committee had not considered the scheme worth supporting. The Committee therefore did not recommend the scheme for approval.	Page 11. <i>Item VII p. 11.</i> The Board noted and did not recommend the scheme for approval.

RESEARCH SCHEMES

Item No.	Particulars.								
VIII	Subject : Research scheme on synthetic petrol by Fischer-Tropsch process by Dr. G. C. Basak and Shri N. C. Neogy, Bengal Engineering College, Howrah. <i>Note :</i> 1. The scheme envisages the production of petrol and allied products by interaction between carbon monoxide and hydrogen in presence of a catalyst by the Fischer Tropsch method. It also aims at production of the above products economically and efficiently making use of the raw materials available in our country. The investigators claim to have succeeded in the use of cobalt-thoria-magnesia catalyst for the above purpose on a laboratory scale. It is proposed to extend the work to the study of various other catalysts like iron, copper, chromium, nickel etc., using different accelerators on a pilot plant scale. The Bengal Engineering College will bear complete expenditure on the first pilot plant which has already been designed and some of the major parts constructed. The investigation is likely to take three years for its completion. 2. The following grant has been asked for during the first year :— <table> <tr> <td>Equipment (Catalyst preparation unit, fittings and erection of the pilot plant)</td><td>... Rs. 8,000</td></tr> <tr> <td>Contingencies (chemicals & apparatus)</td><td>... Rs. 3,750</td></tr> <tr> <td>Staff (One Scientific Asst. on Rs. 160 p m. and one Mechanic on Rs. 60 p m.)</td><td>... Rs. 4,650 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 16,400 (including allowances)</td></tr> </table> 3. The scheme has been referred to the Fuel Research Committee for opinion.	Equipment (Catalyst preparation unit, fittings and erection of the pilot plant)	... Rs. 8,000	Contingencies (chemicals & apparatus)	... Rs. 3,750	Staff (One Scientific Asst. on Rs. 160 p m. and one Mechanic on Rs. 60 p m.)	... Rs. 4,650 (including allowances)	Total	Rs. 16,400 (including allowances)
Equipment (Catalyst preparation unit, fittings and erection of the pilot plant)	... Rs. 8,000								
Contingencies (chemicals & apparatus)	... Rs. 3,750								
Staff (One Scientific Asst. on Rs. 160 p m. and one Mechanic on Rs. 60 p m.)	... Rs. 4,650 (including allowances)								
Total	Rs. 16,400 (including allowances)								
IX	Subject : Research scheme on Palynology by Director, Birbal Sahni Institute of Palaeobotany, Lucknow. <i>Note :</i> 1. The object of the scheme is to intensify and extend the palynological research in the Institute of Palaeobotany and to create a pollen herbarium. One of the striking developments in palaeobotany in recent years is the intensive study of spores and pollen grains. Even in sediments where no other determinable fossils are found it may be possible to obtain micro-fossils like spores.								

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 13. <i>Item VIII p. 13.</i> The Committee noted that the Chairman of the Research Committee had since informed the D.S.I.R. that opinion of the Research Committee on the scheme was divided and therefore it would be discussed by the Fuel Research Committee at its next meeting. The Committee also noted that investigations on Fischer-Tropsch synthesis were also in progress at the Fuel Research Institute. The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the final recommendation of the Fuel Research Committee.	Page 13. <i>Item VIII p. 13.</i> The Board noted and endorsed the recommendation of its Committee.

RESEARCH SCHEMES

<i>m No.</i>	<i>Particulars</i>																		
	An interesting use of this method is in the investigation of coal and lignite, and knowledge of such micro-fossils is used also for the determination of the age of sediments, for the correlation of coal seams and other strata etc. This study now comes under the name of "Palynology". Some investigation in this branch of science was carried out by late Prof. Birbal Sahni and his co-workers. Dr. Ove Arbo Hoeg, Director of the Birbal Sahni Institute, has now proposed to revive this branch of research in the Palaeobotanical Institute by obtaining the services of Dr. G. S. Puri, one of Prof. Birbal Sahni's collaborators, from the Forest Research Institute on loan for two years. Dr. Puri will supervise (i) the establishment of a pollen herbarium which is indispensable for the determination of pollen found in the deposits in the latest periods of geological history, and (ii) collect material for leaf and fruit herbarium which is essential for the study of fossil floras of Pleistocene, Tertiary and Upper Cretaceous age. In addition to this Dr. Puri will also complete his earlier work on pollen and spore collection of Assam Tertiaries which had been financed by the Burmah Oil Company. The work though essentially of academic value will also be useful in connection with researches on allergic diseases, control of honey and determination of age of sediments for the correlation of coal seams and other strata. 2. The scheme is proposed for two years and the following grant has been asked for the first year : <table><tr><td>Equipment</td><td>...</td><td>Rs. 5,000</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 1,000</td></tr><tr><td>Staff :</td><td>...</td><td>Rs. 27,120</td></tr><tr><td colspan="3">(Salary of Dr. G. S. Puri for one year Rs. 13,200</td></tr><tr><td colspan="3">One S. S. A, two J. S. As., one Lab. Attendant and T. A. for four months field work in Assam).</td></tr><tr><td>Total</td><td>Rs.</td><td>33,120</td></tr></table> 3. The scheme has been referred to the Committee for Measurement of Geological Time in India and Chairman, Fuel Research Committee for opinion. The Chairman, Fuel Research Committee has stated that the work is not of immediate bearing on coal and lignite. Developments in later years may prove of interest in the correlation of seams by means of plant micro-fossils and the Fuel Research Committee will then be interested in the scheme. The opinion of the Committee on Measurement of Geological Time in India is awaited.	Equipment	...	Rs. 5,000	Contingencies	...	Rs. 1,000	Staff :	...	Rs. 27,120	(Salary of Dr. G. S. Puri for one year Rs. 13,200			One S. S. A, two J. S. As., one Lab. Attendant and T. A. for four months field work in Assam).			Total	Rs.	33,120
Equipment	...	Rs. 5,000																	
Contingencies	...	Rs. 1,000																	
Staff :	...	Rs. 27,120																	
(Salary of Dr. G. S. Puri for one year Rs. 13,200																			
One S. S. A, two J. S. As., one Lab. Attendant and T. A. for four months field work in Assam).																			
Total	Rs.	33,120																	

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 15. Item IX p. 13-15. The Committee noted that the opinion of the Research Committee had not been received. It was recommended that the members of the Committee be requested to expedite consideration of the scheme and that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the final opinion from the Chairman.	Page 15. Item IX p. 13-15. The Board noted and endorsed the recommendations of its Committee.

RESEARCH SCHEMES

Item No.	Particulars.																		
X	Subject : Research scheme on flora of Delhi State by Dr P. Maheshwari, Head of the Botany Department, Delhi University. <i>Note :</i> 1. The aim of the scheme is to study and compile data on the flora of Delhi State for publication in the form of a book. It will contain illustrated descriptions of all the native and introduced flowering plants in the area ; the common Hindi, Urdu and English names and their correct scientific names as well as the synonyms by which they are known in other publications ; information whether the plant is endemic, indigenous or introduced as well its general range of distribution and other necessary information of importance. Duthie's book "Flora of the Upper Gangetic Plain" is out of date and out of print. There is no other such informative book on Delhi State. Some work has already been carried out at the Botany Department of Delhi University during the past four years. Some collections have been made and a nucleus reference herbarium has also been set up. Further collection and careful study of many Gramineae, Cyperaceae, Leguminosae and Compositae plants is necessary. The investigation is likely to take four years for completion. 2. The following grant is required for the first year :— <table><tr><td>Equipment</td><td>...</td><td>Nil.</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 1,000</td></tr><tr><td colspan="3">(Mounting paper, drawing & photographic material and two trips each year to Dehradun and Calcutta).</td></tr><tr><td colspan="3">Staff :</td></tr><tr><td>(One J.S A. on Rs. 200 p.m.)</td><td>Rs. 3,420</td><td>(including allowances)</td></tr><tr><td colspan="2">Total</td><td>Rs. 4,420 (including allowances)</td></tr></table> 3. The scheme was referred to the following botanists for opinion :— (i) Mr. R. L. Budhwar, Forest Research Institute, Dehra Dun. (ii) Dr. K. Biswas, Botanic Gardens, Calcutta. (iii) Rev. Father H. Santapau, St. Xavier's College, Bombay (iv) Dr. B. P. Pal, Indian Agricultural Research Institute, New Delhi and (v) Dr. T. S. Raghavan of Central Sugar Cane Research Station, Coimbatore.	Equipment	...	Nil.	Contingencies	...	Rs. 1,000	(Mounting paper, drawing & photographic material and two trips each year to Dehradun and Calcutta).			Staff :			(One J.S A. on Rs. 200 p.m.)	Rs. 3,420	(including allowances)	Total		Rs. 4,420 (including allowances)
Equipment	...	Nil.																	
Contingencies	...	Rs. 1,000																	
(Mounting paper, drawing & photographic material and two trips each year to Dehradun and Calcutta).																			
Staff :																			
(One J.S A. on Rs. 200 p.m.)	Rs. 3,420	(including allowances)																	
Total		Rs. 4,420 (including allowances)																	

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

RESEARCH SCHEMES

Item No.	Particulars.
	Mr. Budhwar has supported the scheme. Rev. H. Santapau has also supported the scheme but is of the opinion that such work comes under the Botanical Survey of India. Dr. Biswas says that (i) the proposal is worth considering, (ii) it should be completed within two years, (iii) it is not within the competence of a J.S.A. to do the work, it should be carried out by a more experienced botanist on contract basis, (iv) herbarium work must be done at Calcutta, (v) illustrations on the model of Kandy flora by Alston may be prepared. Dr. Pal says that (i) nearly ten years work has been done by Mr. H.B. Singh of the Indian Agricultural Research Institute with a view to publishing a flora of Delhi State and the work is nearing completion, (ii) C.S.I.R. would be justified in financing a scheme like this, provided it is carried out with a definite objective.
XI	Subject :—Research scheme on the physiological and chemical changes in fruits and vegetables by Dr. J. K. Chowdhury, Prof. of Botany, Presidency College, Calcutta. Note : 1. The objects of the scheme are (a) to gain fundamental knowledge in certain essential aspects of the life processes of the materials which have direct bearing on their storage problems and (b) to understand the commercial needs and requirements of the various plant organs to be stored and investigated upon to assess their possibilities from a scientific point of view. It is proposed to study the following fruits and vegetables, all of which are indigenous to the State of West Bengal and are available in large quantities :— fruits: mango (Maldah and Fazli), banana (Martaman and Champa), orange (Darjeeling). vegetables : tomato, potato (Darjeeling, Red Round and Royal Kidney), patal (Palwal, Trichosanthes dioica) and cauliflower. Experiments will be conducted with a view to determining (i) the commercial storage life of the materials in different stages of maturity under prevailing commercial conditions and also under storage at low temperature ; (ii) the nature of wastage in storage ; (iii) the effect of low temperature on the appearance and quality of the materials in different stages of maturity ; (iv) the keeping quality of materials at ordinary temperature after removal from cold storage ; (v) respiration drift of the materials during maturity and senescence in storage ; and (vi) chemical changes during storage at normal and low temperature.

Recommendations of the Committee of the Board.	Recommendations of the Board.										
Page 19. Item X p. 17-19. Dr. J. N. Mukherjee informed the Committee that the work at the Indian Agricultural Research Institute was essentially on economic plants. The Committee recommended that the research scheme by Dr. Maheshwari be approved and he may be requested to submit a revised programme of work after discussion with Dr. Pal, Director, I. A. R. I. The following grant was recommended (upto 31st March 1953 in the first instance) : <table><tr><td>Equipment</td><td>Nil</td></tr><tr><td>Contingencies</td><td>Rs. 500</td></tr><tr><td>Staff :</td><td>Rs. 1,710 (including allowances)</td></tr><tr><td>(One J.S.A. on Rs. 200)</td><td></td></tr><tr><td>Total</td><td>Rs. 2,210 (including allowances)</td></tr></table>	Equipment	Nil	Contingencies	Rs. 500	Staff :	Rs. 1,710 (including allowances)	(One J.S.A. on Rs. 200)		Total	Rs. 2,210 (including allowances)	Page 19. Item X p. 17-19. The Board noted and endorsed the recommendation of its Committee.
Equipment	Nil										
Contingencies	Rs. 500										
Staff :	Rs. 1,710 (including allowances)										
(One J.S.A. on Rs. 200)											
Total	Rs. 2,210 (including allowances)										

RESEARCH SCHEMES

Item No.	Particulars.															
	The scheme is proposed to be run at the Botany Department of the Presidency College, Calcutta, in co-operation with the Cold Storage Establishment of the Deptt. of Agriculture, Government of West Bengal at Kidderpore, Calcutta. 2. According to the author the non-recurring expenditure (Rs. 3025) is to be met by the Govt. of West Bengal. The recurring expenditure is to be shared on a 50 : 50 basis between the State Government and the C.S.I.R. The recurring expenditure during the first year and the share desired to be given by the CSIR are : — <table><tr><th></th><th>Recurring expenditure.</th><th>CSIR share.</th></tr><tr><td>Equipment ...</td><td>Nil</td><td>Nil</td></tr><tr><td>Contingencies (including T.A.) ...</td><td>Rs. 4,600</td><td>Rs. 2,300</td></tr><tr><td>Staff : (One Res. Asst. in the scale of Rs. 150-5-240 10-300— One Lab. Asst. in the scale of Rs. 30 $\frac{1}{2}$-35-1-45— One Lab. Attendant in the scale of Rs. 20-$\frac{1}{4}$-25— and honorarium for part time clerk @ Rs. 30 p.m.)</td><td>Rs. 4,296</td><td>Rs. 2,148 (including allowances).</td></tr><tr><td>Total</td><td>Rs. 8,896</td><td>Rs. 4,448 (including allowances)</td></tr></table> 3. The scheme was first submitted to and was considered by the Indian Council of Agricultural Research. Their Fruit and Vegetables Committee was of the opinion that there was no need to repeat the type of work envisaged in the scheme as quite a lot of it had already been done in the country at the expense of I.C.A.R. On the recommendation of their Botany Committee, the I.C.A.R. have forwarded the scheme to the C.S.I.R. as the work contemplated in the scheme now came under the purview of the C.S.I.R. 4. The scheme was referred to the Biochemical Research Committee of the C.S.I.R. and the Director, Central Food Technological Research Institute, Mysore. The Director C.F.T.R.I. says, "This type of work is being done on a much bigger scale in the Storage and Preservation Division of this Institute. Although some of the local varieties from Bengal may not have been studied by us, we are already in a position to supply a substantial amount of general information bearing on the storage of different types of fruits and vegetables. I do not see therefore any necessity of duplicating this type of work. The Bengal varieties could also be studied by us". The opinion of the Biochemical Research Committee is awaited.		Recurring expenditure.	CSIR share.	Equipment ...	Nil	Nil	Contingencies (including T.A.) ...	Rs. 4,600	Rs. 2,300	Staff : (One Res. Asst. in the scale of Rs. 150-5-240 10-300— One Lab. Asst. in the scale of Rs. 30 $\frac{1}{2}$ -35-1-45— One Lab. Attendant in the scale of Rs. 20- $\frac{1}{4}$ -25— and honorarium for part time clerk @ Rs. 30 p.m.)	Rs. 4,296	Rs. 2,148 (including allowances).	Total	Rs. 8,896	Rs. 4,448 (including allowances)
	Recurring expenditure.	CSIR share.														
Equipment ...	Nil	Nil														
Contingencies (including T.A.) ...	Rs. 4,600	Rs. 2,300														
Staff : (One Res. Asst. in the scale of Rs. 150-5-240 10-300— One Lab. Asst. in the scale of Rs. 30 $\frac{1}{2}$ -35-1-45— One Lab. Attendant in the scale of Rs. 20- $\frac{1}{4}$ -25— and honorarium for part time clerk @ Rs. 30 p.m.)	Rs. 4,296	Rs. 2,148 (including allowances).														
Total	Rs. 8,896	Rs. 4,448 (including allowances)														

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 21 Item XI p. 19-21. The Committee noted that the opinion of the Bio-Chemical Research Committee had since been received. The Research Committee had not recommended the scheme as no new line of approach had been suggested beyond what had already been carried out in the subject and since the subject was now being studied in a systematic manner in the C.F.T.R.I., Mysore.	Page 21 Item XI p. 19-21. The Board agreed with the opinion of the Bio-Chemical Research Committee and did not recommend the scheme for a grant-in-aid.

RESEARCH SCHEMES

Item No.	Particulars.								
XII	<i>Subject :</i> Research scheme on a new variety of food yeast by Dr. N. R. Dhar, Director, Sheila Dhar Institute of Soil Science & Head of the Chemistry Department, Allahabad University. <i>Note :</i> 1. Dr. Dhar claims to have discovered a new variety of yeast which can grow in cultures containing only ethyl alcohol as source of carbon and the yield is 20 times greater than other varieties even under non-aerated conditions. This yeast can thus be made to grow on many industrial waste liquors which contain such a low percentage of alcohol that it cannot be otherwise profitably recovered. It is proposed to (a) work out the optimum conditions of production for this yeast from different raw materials (like molasses, barley, maize, wheat, tapioca, fresh and old toddy, sulphite liquor of paper industry, and other industrial wastes of low alcohol content); (b) to find out a better source of nitrogen than ammonium sulphate as yeast food. The effect of temperature aeration, foreign chemicals etc. will be investigated (c) composition of food yeast with respect to certain important amino acids, vitamins, phosphorous compounds etc. and (d) to investigate the conditions under which "Dhar yeast" will be rich in ergosterol. Attempts will also be made to discover other varieties of yeast with similar potentialities. The scheme is for five years. 2. The following grant has been asked for the first year : <table> <tr> <td>Equipment (Bekman photoelectric spectro photometer)</td><td>Rs. 30,000</td></tr> <tr> <td>Contingencies</td><td>Rs. 2,000</td></tr> <tr> <td>Staff : (One Senior Scientific Assistant).</td><td>Rs. 7,320 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 39,320 (including allowances)</td></tr> </table> 3. The scheme has been referred to the Biochemical Research Committee, for opinion.	Equipment (Bekman photoelectric spectro photometer)	Rs. 30,000	Contingencies	Rs. 2,000	Staff : (One Senior Scientific Assistant).	Rs. 7,320 (including allowances)	Total	Rs. 39,320 (including allowances)
Equipment (Bekman photoelectric spectro photometer)	Rs. 30,000								
Contingencies	Rs. 2,000								
Staff : (One Senior Scientific Assistant).	Rs. 7,320 (including allowances)								
Total	Rs. 39,320 (including allowances)								
XIII	<i>Subject:</i> Research scheme on Indian cardiac drugs by Prof. S. Rangaswami, Head of the Department of Pharmacy, Andhra University, Waltair. <i>Note :</i> 1. It is proposed to make a detailed study of the chemistry of Indian cardiac drugs and work out methods for the preparation of pharmaceutical products from them. Indian Squill and Odallam will be taken up first.								

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 23 Item XII p. 23. The Committee noted that Dr. Dhar had been requested, as suggested by the Research Committee, to send cultures of the yeast developed for morphological examination and comparative study. The Bio-Chemical Research Committee would then reconsider the scheme. It was recommended that the D. S. I. R. be authorised to take necessary action departmentally on receipt of the final opinion of the Research Committee.	Page 23 Item XII p. 23. The Board noted and endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars.								
	The various cardiac drugs mentioned in the British and American pharmacopoeias are obtained from plants of Digitalis, Strophanthus and Urginea species. In India we have neither Digitalis species nor Strophanthus species growing to any extent but two species of squill (Urginea indica and Scilla indica) are available in different parts of the country. Urginea indica was recognised during the war as a substitute for the European species and Scilla indica is often used as a substitute for Urginea indica. Similarly considerable work has been done in the continental laboratories on Cerebera odallam, presumably of African origin, for converting its extract, which is a heart poison, into a useful drug. Some work has been done by A. N. Poti of Travancore University on the Travancore variety of Cerbera odallam. Prof. Rangaswami considers that further work is necessary. Dr. Rangaswami has worked on cardiac glycosides of Nerium odorum in the Laboratories of Prof. T. Reichstein, N.L. 2. The following grant has been asked for : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>... Rs. 1,500</td></tr> <tr> <td>Staff (One Junior Research Assistant)</td><td>... Rs. 2,640 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 4,140 (including allowances)</td></tr> </table> 3. The scheme has been referred to the Pharmaceuticals & Drugs Research Committee for opinion.	Equipment	Nil	Contingencies	... Rs. 1,500	Staff (One Junior Research Assistant)	... Rs. 2,640 (including allowances)	Total	Rs. 4,140 (including allowances)
Equipment	Nil								
Contingencies	... Rs. 1,500								
Staff (One Junior Research Assistant)	... Rs. 2,640 (including allowances)								
Total	Rs. 4,140 (including allowances)								
XIV	Subject : Availability of calcium from Indian foodstuffs in cases of osteoporosis and osteomalacia by Dr. B. N. Sinha, Head of Dept. of Orthopaedic Surgery, King George's Medical College, Lucknow and Orthopaedic Surgeon, Gandhi Memorial Hospital, Lucknow. Note : 1. The object of the scheme is to find out indigenous foods and calcium resources that easily contribute calcium and factors that accelerate its absorption in the pathological cases of osteoporosis and osteomalacia (Osteoporosis is development of porous structure by absorption of bone and osteomalacia is softening of bones as a result of absorption of calcium salts from them).								

Recommendations of the Committee of the Board.	Recommendations of the Board.								
Page 25. Item XIII p. 23-25. The Committee noted that the opinion of the Pharmaceuticals and Drugs Research Committee recommending the scheme had since been received. The Committee recommended that the research scheme on Indian Cardiac drugs be approved and the following grant be made (up to 31st March 1953 in the first instance) :— <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 500</td></tr> <tr> <td>Staff : (One Junior Research Asst. on Rs. 160 p.m.)</td><td>Rs. 1,320 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 1,820 (including allowances)</td></tr> </table> The Committee considered the question of inclusion of those indigenous drugs in use such as Narbasi possessing cardiac action and it was recommended that the advice of the Chairman of the Research Committee be obtained on the specific drugs to be investigated. It was also recommended that the work may be coordinated with that under way in the Central Drug Research Institute.	Equipment	Nil	Contingencies	Rs. 500	Staff : (One Junior Research Asst. on Rs. 160 p.m.)	Rs. 1,320 (including allowances)	Total	Rs. 1,820 (including allowances)	Page 25. Item XIII p. 23-25. The Board noted and endorsed the recommendations of its Committee.
Equipment	Nil								
Contingencies	Rs. 500								
Staff : (One Junior Research Asst. on Rs. 160 p.m.)	Rs. 1,320 (including allowances)								
Total	Rs. 1,820 (including allowances)								

RESEARCH SCHEMES

Item No.	Particulars															
	K. P. Basu & co-workers have carried out work on a large number of Indian foodstuffs which have got available calcium but no work has been done to determine whether this calcium is available in cases of osteoporosis and osteomalacia as well. Plenty of work has also been done on the utilisation of calcium and factors governing the same in osteoporosis and osteomalacia cases but almost all literature deals with utilisation of calcium as a drug and not as a food in clinical practice. Dr. B. K. Malviya, Prof. of Biochemistry in the same college will also collaborate in the scheme. 2. The following grant is needed : <table><tr><td>Equipment</td><td>...</td><td>Nil</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 2,400</td></tr><tr><td>Staff</td><td>...</td><td>Rs. 4,080 (including allowances)</td></tr><tr><td colspan="3">(One Senior Scientific Asst.)</td></tr><tr><td>Total</td><td>Rs. 6,480</td><td>(including allowances)</td></tr></table> 3. The scheme has been referred to the Pharmaceuticals and Drugs Research Committee and the Director, Central Food Technological Research Institute for opinion.	Equipment	...	Nil	Contingencies	...	Rs. 2,400	Staff	...	Rs. 4,080 (including allowances)	(One Senior Scientific Asst.)			Total	Rs. 6,480	(including allowances)
Equipment	...	Nil														
Contingencies	...	Rs. 2,400														
Staff	...	Rs. 4,080 (including allowances)														
(One Senior Scientific Asst.)																
Total	Rs. 6,480	(including allowances)														
XV	Subject : Research scheme on chemical investigation of the unsaponifiable matter in Indian edible oils with special reference to steroid fractions by Dr. A. Tyabji, Ph.D. (Zurich), A.R.I.C., Bombay. Note : 1. It is proposed to study systematically the non-saponifiable fractions of indigenous germ oils. The objectives are (a) to discover a good source of steroids and (b) to probe deeper into the structure. As unsaponifiable fractions contain physiologically active substances and as there is an active search for new sources of steroids containing C₁₁ oxygen group, such a study is expected to be of interest. Karrer and Salamon have isolated 3 new substances having partly the properties of sterols from wheat germ oil and gave them the name of tritisterols. The proposed work will be similar. The work is to be carried out at the Institute of Science, Bombay. At Zurich the investigator was associated with the two leading schools of L. Ruzika, N.L. and T. Reichstein, N.L., in this field of research.															

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 27 Item XIV p. 25-27. The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally on obtaining the recommendation of the Pharmaceuticals and Drugs Research Committee and the opinion of the Director, C.F.T.R.I.	Page 27 Item XIV p. 25-27. The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars.									
	2. The following grant has been asked for the first year :									
	<table><tr><td>Equipment and Contingencies</td><td>...</td><td>Rs. 1,500</td></tr><tr><td>Staff (no details given)</td><td>...</td><td>Rs. 3,000</td></tr><tr><td>Total</td><td></td><td>Rs. 4,500</td></tr></table>	Equipment and Contingencies	...	Rs. 1,500	Staff (no details given)	...	Rs. 3,000	Total		Rs. 4,500
Equipment and Contingencies	...	Rs. 1,500								
Staff (no details given)	...	Rs. 3,000								
Total		Rs. 4,500								
	3. The scheme has been referred to the Vegetable Oils Research Committee for opinion.									
XVI	Subject : Revision of Bulletin No. 10-Indian Vegetable Oils by the Director, N.C.L. Note : 1. Bulletin No. 10 of Indian Industrial Research Bureau entitled "Indian Vegetable Oils" was first published by Mr. N. Brodie in 1937 and then revised in 1943 by Mr. S M. Sen Gupta. Since 1943, substantial amount of work has been done on Indian vegetable oils and their seeds. A lot of useful data on the subject is also available as a result of the working of the Indian Central Oilseeds Committee since 1947. It is therefore considered desirable that the bulletin may again be revised and brought up-to-date. Dr. J.S. Aggarwal and Mr. P. Gopal Sharma of the National Chemical Laboratory would undertake the work. An honorarium of Rs. 200 to Mr. P. Gopal Sharma has been suggested. The publication of the bulletin may be done through the Publication Division of the C.S.I.R. 2. The Chief Editor, Publications, who was consulted says that the Publication Division has already started the work of revision of the above mentioned bulletin. The subject matter is also closely allied to the work of compilation of the Dictionary. They have also the necessary library facilities. The Chief Editor, therefore, suggests that the revision of the bulletin may be allowed to be done by the Publication Division itself.									
XVII	Subject : Research scheme on manufacture & utilisation of cellulose ethers and esters by the Director, National Chemical Laboratory, Poona. Note : The aim of this scheme is to involve processes, suitable under Indian conditions, for the commercial production of cellulose ethers and esters and also to examine their uses. The programme of investigation will comprise :— (i) pilot plant work on ethyl cellulose, carboxy methyl cellulose and cellulose nitrate to									

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 29 Item XV p. 27-29 The Committee recommended that the Vegetable Oils Research Committee be requested to expedite consideration of the scheme and that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the opinion of the Research Committee.	Page 29 Item XV p. 27-29. The Board endorsed the recommendations of its Committee.
Item XVI p. 29- Since the Publication Division of the Council had already taken up the work of revision of the bulletin "Indian Vegetable Oils" without involving additional expenditure, it was recommended that the Chief Editor be permitted to complete this work. The Committee therefore did not recommend the scheme put forward by the Director, N.C.L.	

RESEARCH SCHEMES

Item No.	Particulars.												
	work out complete process details and to collect the relevant engineering data for designing a plant. (ii) investigation of the possibilities of making ethyl chloride, a raw material used for making ethyl cellulose, from alcohol and hydrochloric acid in the presence of a catalyst. Monochloro acetic acid an essential raw material in the production of carboxy methyl cellulose is likely to be manufactured by the Sirsilk Mills, Hyderabad where an acetic acid plant is being put up. A literature survey has been made. Work on the production of cellulosic pulp from indigenous raw materials has been initiated in the N.C.L. Chemical cotton is also proposed to be made from cotton linters on a pilot plant scale. Experimental work on production of ethylene from ethyl alcohol is being taken up at the N.C.L. The estimated cost of production on a basis of 500 lb per day of ethyl cellulose and cellulose nitrate is Rs 3-2-6 and 1-5-0 per lb respectively. The scheme is expected to be completed in two years. 2. The following grant is needed for the first year :— <table> <tr> <td>Equipment</td><td>Rs. 37,000</td></tr> <tr> <td>(Nickel lined steam jacketted autoclave cap. 30-22 lbs, nitrator, stainless steel centrifuge, testing equipment).</td><td></td></tr> <tr> <td>Contingencies</td><td>... Rs. 600</td></tr> <tr> <td>Staff</td><td></td></tr> <tr> <td>(Labourer on Rs. 75 p.m.)</td><td>... Rs. 900</td></tr> <tr> <td>Total</td><td>Rs. 38,500</td></tr> </table> 3. A similar scheme on the same subject received from Shri Ram Institute for Industrial Research was considered by the B.S.I.R. in their 28th meeting held on March 19, 1952. The	Equipment	Rs. 37,000	(Nickel lined steam jacketted autoclave cap. 30-22 lbs, nitrator, stainless steel centrifuge, testing equipment).		Contingencies	... Rs. 600	Staff		(Labourer on Rs. 75 p.m.)	... Rs. 900	Total	Rs. 38,500
Equipment	Rs. 37,000												
(Nickel lined steam jacketted autoclave cap. 30-22 lbs, nitrator, stainless steel centrifuge, testing equipment).													
Contingencies	... Rs. 600												
Staff													
(Labourer on Rs. 75 p.m.)	... Rs. 900												
Total	Rs. 38,500												

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

RESEARCH SCHEMES

Item No.	Particulars.
	financial implications of that scheme were :—
	Equipment (Institute will provide). Nil
	Contingencies : (including testing equipment etc) Rs. 5,000
	Staff :
	(One Senior Res. Asst. on Rs. 250 p.m. One Lab. Boy on Rs. 75 p.m)
	Rs. 4,980 (including allowances)
	Total Rs. 9,980 (including allowances)
	Both the schemes were referred to the Cellulose Research Committee for opinion.
	The Research Committee is unanimous that the work shall be financed by the C.S.I.R. but at the same time duplication must be avoided and economic factors should be borne in mind. A comparison of the two schemes shows that they are the same except that N.C.L. has taken up cellulose esters in addition. The Cellulose Research Committee has not contemplated work on this now. Shri Ram Institute has already got the services of an experienced worker in this subject. Under the circumstances the scheme by the Shri Ram Institute of Industrial Research is recommended for acceptance.
	It is also felt that the expenditure is rather on the high side and could be reduced. The scheme submitted by the Shri Ram Institute should be limited to two years instead of three.
	As the uses to which cellulose ethers are put are well known, they should primarily concentrate on the methods of manufacture of the cellulose ethers bearing in mind the availability of raw materials locally and the economics of the process. If however, at a later stage it is found advisable to work on the utilisation aspects, a fresh scheme can be placed before the Committee.
	The Committee is further of the view that work on ethyl cellulose should be given precedence over the carboxy-methyl cellulose in view of the fact that some work has already been done by Dr. C.S. Patel on this item. The Director, Shri Ram Institute may be asked to revise the scheme in the light of these remarks.
XVIII	Subject : Research scheme on manufacture of unbreakable glass tumblers by Dr. R. Charan, Head of the Department of Glass Technology, Banaras Hindu University.
	Note:
	1. The aim of the scheme is to work out the best composition of glass and to find out the best medium and temperature necessary to produce a uniform strength on the glass surface.

Recommendations of the Committee of the Board.	Recommendations of the Board.										
Page 33. Item XVII p. 29-33. The Committee recommended that the research scheme on manufacture of cellulose ethers by the Director, Shri Ram Institute for Industrial Research be approved and the following grant be made for the period upto 31st March 1953 in the first instance :— <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff :</td><td>Rs. 2,040 (including allowances)</td></tr> <tr> <td>(One Senior Res. Asst. on Rs. 250 p.m.)</td><td></td></tr> <tr> <td>Total</td><td>Rs. 3,040 (including allowances)</td></tr> </table> It was further recommended that Shri Ram Institute be requested to revise the programme of work as suggested by the Cellulose Research Committee.	Equipment	Nil	Contingencies	Rs. 1,000	Staff :	Rs. 2,040 (including allowances)	(One Senior Res. Asst. on Rs. 250 p.m.)		Total	Rs. 3,040 (including allowances)	Page 33. Item XVII p. 29-33. The Board endorsed the recommendation of its Committee.
Equipment	Nil										
Contingencies	Rs. 1,000										
Staff :	Rs. 2,040 (including allowances)										
(One Senior Res. Asst. on Rs. 250 p.m.)											
Total	Rs. 3,040 (including allowances)										

RESEARCH SCHEMES

Item No.	Particulars.												
	The investigator has seen this work being done in Czechoslovakia. The investigator considers that the life of such glassware will be increased and so it will be economical to use such glassware. 2. The following grant has been asked for : <table><tr><td>Equipment (Tumbler making press, oil burner with blower and furnace)</td><td>...</td><td>Rs. 11,000</td></tr><tr><td>Contingencies (Raw materials and oil)</td><td>...</td><td>Rs. 2,000</td></tr><tr><td>Staff (One Junior Scientific Asstt. on Rs. 160 p.m. One Press man on Rs. 35/- p.m., One glass helper on Rs. 30/- p.m.)</td><td>...</td><td>Rs. 4,500 (including allowances)</td></tr><tr><td colspan="2">Total</td><td>Rs. 17,500 (including allowances)</td></tr></table> 3 The scheme has been referred to the Glass & Refractories Research Committee for opinion.	Equipment (Tumbler making press, oil burner with blower and furnace)	...	Rs. 11,000	Contingencies (Raw materials and oil)	...	Rs. 2,000	Staff (One Junior Scientific Asstt. on Rs. 160 p.m. One Press man on Rs. 35/- p.m., One glass helper on Rs. 30/- p.m.)	...	Rs. 4,500 (including allowances)	Total		Rs. 17,500 (including allowances)
Equipment (Tumbler making press, oil burner with blower and furnace)	...	Rs. 11,000											
Contingencies (Raw materials and oil)	...	Rs. 2,000											
Staff (One Junior Scientific Asstt. on Rs. 160 p.m. One Press man on Rs. 35/- p.m., One glass helper on Rs. 30/- p.m.)	...	Rs. 4,500 (including allowances)											
Total		Rs. 17,500 (including allowances)											
XIX	Subject : Research scheme on the manufacture of thermos flasks by Dr. R. Charan, Head of the Department of Glass Technology, Banaras Hindu University. Note : 1. The aim of the scheme is to find out a cheaper process for the manufacture of thermos flasks so that their manufacture can be taken up as a cottage industry. According to the investigator thermos flasks are being manufactured only at Bombay and they too are very costly. The investigator has seen this work being done in Czechoslovakia and he proposes to make the process cheap enough for cottage industry as in Japan. The work will be completed in one year. 2. The following grant has been asked for : <table><tr><td>Equipment (Glass blowing table and vacuum creating machine)</td><td>...</td><td>Rs. 3,000</td></tr><tr><td>Contingencies (Glass shells, chemicals etc.)</td><td>...</td><td>Rs. 3,000</td></tr><tr><td>Staff (One glass blower on Rs. 60 p.m.)</td><td>...</td><td>Rs. 1,404 (including allowances)</td></tr><tr><td colspan="2">Total</td><td>Rs. 7,404 (including allowances)</td></tr></table> 3. The scheme has been referred to the Glass and Refractories Research Committee for opinion.	Equipment (Glass blowing table and vacuum creating machine)	...	Rs. 3,000	Contingencies (Glass shells, chemicals etc.)	...	Rs. 3,000	Staff (One glass blower on Rs. 60 p.m.)	...	Rs. 1,404 (including allowances)	Total		Rs. 7,404 (including allowances)
Equipment (Glass blowing table and vacuum creating machine)	...	Rs. 3,000											
Contingencies (Glass shells, chemicals etc.)	...	Rs. 3,000											
Staff (One glass blower on Rs. 60 p.m.)	...	Rs. 1,404 (including allowances)											
Total		Rs. 7,404 (including allowances)											

<i>Recommendations of the Committee of the Board.</i>	<i>Recommendations of the Board.</i>
Page 35 <i>Item XVIII & XIX p. 33-35.</i> The Committee recommended that the D.S.I.R. be authorised to take necessary action departmentally on receipt of the opinion of the Glass & Refractories Research Committee.	Page 35 <i>Item XVIII & XIX p. 33-35.</i> The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
XX	<i>Subject :</i> Training in statistical quality control by Prof. P. C. Mahalanobis, F. R. S. <i>Note :</i> Prof. P. C. Mahalanobis has sent the following proposal for training 5 workers in statistical quality control by the United Nations Technical Assistance Administration team coming to India in October 1952. 1. The chief obstacle to the promotion of statistical quality control work in India has been the lack of trained personnel. There are many people with a theoretical knowledge of the subject but very few have experience of practical work in SQC. Also, there is practically no one in India with knowledge and experience of initiative, training and research programme in this subject. The United Nations Technical Assistance Administration has agreed, at the request of the Government of India, to send to India a Statistical Quality Control Team for about 4 months from October of this year. The UN SQC Team would have two main objects. One would be to organize short training courses at a number of important industrial centres in India. Secondly, it is proposed that a number of statisticians or qualified industrial engineers with some background of knowledge of statistical quality control should be attached to the UN Team to learn how the UN Team does its work with a view to continue similar work in India in future. 2. It is necessary to select trainees with some experience of either statistical or industrial work. A convenient plan may be to offer a consolidated training allowance of say Rs. 300 per month plus travel and halage allowances which would probably come to about Rs. 400 per month. The cost per trainee would be thus about Rs. 700 per month or for 4 months say Rs. 3000 per trainee. It is suggested that the Council of Scientific and Industrial Research should sanction an ad hoc grant of Rs. 15,000 to meet the expenses of 5 trainees. If this is done we should immediately have a group of trained SQC workers who can be then used to promote SQC in India in various ways, in view of the acute shortage of trained personnel with actual experience of practical work. The trainees can be selected by a small committee consisting of Dr. S. S. Bhatnagar, Dr. L. C. Verman and Prof. Mahalanobis.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 37 Item XX p. 37. The Committee noted that the scheme had been referred to the members of the Statistics, Standards and Quality Control Committee for opinion. The Committee was of the opinion : (i) the fullest advantage should be taken of the foreign experts. (ii) that the candidates should be selected to cover different industries and distributed according to their special qualifications (iii) the period of 4 months was too short and the services of the U. N. Experts should be secured for a longer period. (iv) best results would be obtained if the trainees work for some length of time at selected centres. The Committee generally approved of the proposal put forward by Prof. Mahalanobis and recommended that the D.S.I.R. be authorised to take necessary action departmentally to work out the details and implement the scheme.	Page 37 Item XX p. 37. The Board agreed with the opinion of its Committee and recommended that the D.S.I.R. be authorised to take necessary action departmentally on the lines suggested by the Committee in consultation with Prof. Mahalanobis. The Board attached special importance to the development of Quality Control work in India and it was recommended that Prof. Mahalanobis and the Research Committee be requested to consider this matter further and prepare a detailed programme.

PROCEEDINGS OF IONOSPHERIC CO-ORDINATION SUBCOMMITTEE

Item No.	Particulars.
XXI	<i>Subject :—</i> Proceedings of the Sub-Committee on Co-ordination and Publication of Ionospheric Data (Radio Research Committee : Chairman Dr. K.S. Krishnan). <i>Synopsis :</i> 1. Two meetings of the Sub-committee for formulating a suitable programme for implementing the resolution of the B.S.I.R. for co-ordination and publication of ionospheric data by a single agency were held in Delhi on the 14th March and 29th May 1952. 2. The Sub-Committee has recommended that the following be published in the bulletin, in conformity with the recommendations of the International Scientific Radio Union :— (i) Hourly values of foF₂, foF₁, foE, fEs, h'F₂, hpF₂, h'F₁, h'E, h'Es, M(3000)F₂, M(3000)F₁, sunspot numbers. (ii) Charts giving the monthly average characteristics of foF₂, foF₁, foE, foEs, h'F₂, h'F₁, h'E and h'Es. (iii) Predicted charts of M.U.F's for various distances for four stations in India (a) Delhi, (b) Calcutta, *(c) Bombay or Ahmedabad, *(d) Madras or Kodaikanal. (*as found practicable). The Sub-Committee has considered the desirability of including any other information in the proposed ionospheric bulletin in addition to the above. It is felt that it will be of great interest to scientific organisations if, constants defining the variations of electron density, (assuming parabolic distribution) of the ionospheric layer in the neighbourhood of total reflection at vertical and oblique incidence can be published. The Chief Engineer, All India Radio, has observed that his Department will undertake investigations to see if it is practicable to obtain the data on oblique incidence regularly. It is recommended that the sunspot numbers and solar flare data be also incorporated, if these data can be obtained regularly from the India Meteorological Department. 3. The Sub-Committee has recommended that an organisation be set up under the Radio Research Committee, C.S.I.R. (which is now the National Committee in India for the U.R.S.I. and consists of representatives of all organisations interested in ionospheric data) for undertaking the proposed publication of ionospheric data. The Chief Engineers of the All India Radio and Posts and Telegraphs have assured that their respective departments would be prepared to co-operate in this work.

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

PROCEEDINGS OF IONOSPHERIC CO-ORDINATION SUBCOMMITTEE

Item No.	Particulars.						
	4. The Sub-Committee has considered that the following grants and staff will be needed to implement this programme :— <table> <tr> <td>Equipment (Projection Equipment, File Rack, Almirah —1, Typewriter —1, and other furniture, for the staff.</td><td>Rs. 3,000</td></tr> <tr> <td>Contingencies</td><td>Rs. 2,000</td></tr> <tr> <td>Staff : (2 Res. Assts. Jr. in the scale Rs. 160-10-330. 1 Statistical Assistant in the scale Rs. 160-10-330. 1 Draftsman in the scale Rs. 100-185 1 Stenotypist—in the scale Rs. 55-130+Rs. 20 allowance. 1 Clerk—in the scale Rs. 55-130)</td><td>Rs. 13,920</td></tr> </table> 5. The publication cost of the bulletin which will be a monthly of about 50 pages : Rs. 7,500. It is recommended that the bulletin be published by the Publication Division of C.S.I.R.	Equipment (Projection Equipment, File Rack, Almirah —1, Typewriter —1, and other furniture, for the staff.	Rs. 3,000	Contingencies	Rs. 2,000	Staff : (2 Res. Assts. Jr. in the scale Rs. 160-10-330. 1 Statistical Assistant in the scale Rs. 160-10-330. 1 Draftsman in the scale Rs. 100-185 1 Stenotypist—in the scale Rs. 55-130+Rs. 20 allowance. 1 Clerk—in the scale Rs. 55-130)	Rs. 13,920
Equipment (Projection Equipment, File Rack, Almirah —1, Typewriter —1, and other furniture, for the staff.	Rs. 3,000						
Contingencies	Rs. 2,000						
Staff : (2 Res. Assts. Jr. in the scale Rs. 160-10-330. 1 Statistical Assistant in the scale Rs. 160-10-330. 1 Draftsman in the scale Rs. 100-185 1 Stenotypist—in the scale Rs. 55-130+Rs. 20 allowance. 1 Clerk—in the scale Rs. 55-130)	Rs. 13,920						
XXII	<i>Subject : Proceedings of the Plastics Research Committee (Chairman : Dr. L. C. Verman).</i> <i>Synopsis :</i> 1. A meeting of the Plastics Research Committee was held on April 14, 1952 at Bombay. 2. REPORT ON 'SURVEY OF RESEARCH PROBLEMS IN PLASTICS'. (i) The comments on the new report (as revised and re-written by the NCL) which could not be circulated earlier were read out by the various members. Prof. McBain then informed the Committee that although he was not very happy about the research problems suggested in the report as written by the NCL, he felt that the report was a summary of the present knowledge of the subject. The Indian work, mainly carried out in the laboratories of the C.S.I.R., in his opinion, was ably summarised in the "Review of work done under the PRC". He tabled a list of about 77 research problems which could be included in the						

Recommendations of the Committee of the Board.	Recommendations of the Board.								
Page 41. Item XXI p. 39-41. The Committee recommended that the scheme prepared by the Sub-Committee on Co-ordination and publication of Ionospheric data be approved and the following grant be made available for implementing the programme (upto 31st March 1953 in the first instance): <table> <tr> <td>Equipment</td><td>Rs. 3,000</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (3 Jr. Res. Assts. One Statistical 1 Draftsman 1 Stenotypist clerk)</td><td>Rs. 6,240 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 10,240 (including allowances)</td></tr> </table> It was also recommended that the bulletin be published through the Publications Division of the C.S.I.R. It was further recommended that the D.S.I.R. be authorised to select and appoint the staff as and when necessary in consultation with the Chairman of the Research Committee.	Equipment	Rs. 3,000	Contingencies	Rs. 1,000	Staff : (3 Jr. Res. Assts. One Statistical 1 Draftsman 1 Stenotypist clerk)	Rs. 6,240 (including allowances)	Total	Rs. 10,240 (including allowances)	Page 41. Item XXI p. 39-41. The Board endorsed the recommendations of its Committee.
Equipment	Rs. 3,000								
Contingencies	Rs. 1,000								
Staff : (3 Jr. Res. Assts. One Statistical 1 Draftsman 1 Stenotypist clerk)	Rs. 6,240 (including allowances)								
Total	Rs. 10,240 (including allowances)								
Item XXII p. 41. PLASTICS RESEARCH COMMITTEE. 1. p. 41. The Committee noted.	Item XXII p. 41. PLASTICS RESEARCH COMMITTEE. 1. p. 41. The Board noted.								

PROCEEDINGS OF PLASTICS RESEARCH COMMITTEE

Item No.	Particulars.
	report. He then expressed his desire that the Committee should publish this report; if not, he said that the report may be allowed to be published under other auspices. The Chairman then explained the background against which the original report had been compiled by Dr. A. Jogarao and traced the steps which led to the present revision. After discussion, the Committee agreed that the original purpose of the compilation of the report had not been satisfied by the new report. The Committee, therefore, recommended that the NCL report be noted and not published. It further expressed the view that if any other organization such as the NCL decided to publish the report, it would be desirable that its title did not appear as the 'Survey of Research Problems in Plastics', and the problems themselves may also be omitted from the text with advantage. (ii) The Committee, however, felt that although the new report had not been satisfactory, it was still necessary to have a report discussing the various problems that should be tackled in India. The Committee recommended that the problems at the end of each chapter in the original report of Dr. Jogarao, those tabled by Prof. McBain at the time of the meeting and those occurring in the new NCL report should be collected, classified under suitable headings, such as, applied, fundamental, etc. and incorporated in the projected report. Dr. Jogarao's report should form the basis for the new revised report. The revised report should attempt to bring up-to-date the survey of the industrial, raw material and economic position of the country and then suggest problems which could be investigated with profit, both to the industrial and the academic interests. For this purpose as many copies of Dr. Jogarao's report as available were to be circulated immediately among members for obtaining their detailed suggestions as to possible additions and alterations. Prof. McBain stated that he had not seen or gone through Dr. Jogarao's original report and he expressed a desire to be included in the circulating list. On the basis of these suggestions and with the help of the Technical Assistant, Shri Kamath, Dr. Palit and Shri Srinivasan would undertake the compilation of the new report and classification of the problems. It was also recommended that the new report, when ready, should be circulated among members before publishing it. 3. REVIEW OF WORK DONE UNDER THE P.R.C. The committee noted the alterations made in the Review.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 43 2. p. 41-43. The Committee generally agreed with the views of the Research Committee and endorsed the recommendation of the Research Committee that a revised report be prepared surveying the research problems in plastics with reference to India on the basis of Dr. Joga Rao's original report. It was recommended that Mr. N. R. Kamath, Dr. S. R. Palit and Mr. N. Srinivasan be requested to take up the work at an early date with the help of the Technical Assistant. 3. p. 43. The Committee noted.	Page 43 2. p. 41-43. The Board endorsed the recommendations of its Committee. 3. p. 43 The Board noted.

PROCEEDINGS OF PLASTICS RESEARCH COMMITTEE

Item No.	Particulars								
4.	ARTICLE FOR THE J. S. I. R. The Committee noted that Dr. Kapur was collecting material for the article, and that Dr. Palit had started writing the article.								
5.	NEW SCHEME : <i>Studies on thermodynamic properties of high polymer solutions by Dr. Santi R. Palit.</i> The Committee recommended the following scheme for sanction :— [Note : High polymeric substances show some characteristic departures from classical laws of solutions, from a study of which it is possible to derive information about the shape and dimensions of the dispersed molecules. Under this scheme it is proposed to make detailed measurements of thermodynamic properties (including osmometric, viscometric, light scattering and other properties) of solutions of high polymers such as polystyrene, polymethyl methacrylate etc., at different temperatures in different hydrocarbon, ketone and chlorinated solvents together with mixture of each of these with non-solvents or latent solvents of the alcoholic type. Such a study will throw much light on the shape, size and structure of the large molecules studied and will also give some information about the interaction of these polymeric substances with themselves and with solvents of different types. The following grant has been asked for the first year : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies (including chemicals).</td><td>Rs. 2,000</td></tr> <tr> <td>Staff : (One J. S. A)</td><td>Rs. 3,060 (including allowances.)</td></tr> <tr> <td>Total</td><td>Rs. 5,060 (including allowances)]</td></tr> </table>	Equipment	Nil	Contingencies (including chemicals).	Rs. 2,000	Staff : (One J. S. A)	Rs. 3,060 (including allowances.)	Total	Rs. 5,060 (including allowances)]
Equipment	Nil								
Contingencies (including chemicals).	Rs. 2,000								
Staff : (One J. S. A)	Rs. 3,060 (including allowances.)								
Total	Rs. 5,060 (including allowances)]								
6.	SCHEME FOR EXTENSION : <i>Construction of osmometers suitable for high polymer research by Dr. Santi R. Palit.</i> Dr. Palit showed the Committee the model of the improved type of osmometer in which only a very small volume of solution was required and which allowed quick measurement. Another feature of this osmometer, Dr. Palit stated, was that it was made slotted on one side so that the solution inside could be observed from outside. The Committee noted the progress in the scheme. The Committee also noted that the osmometers were being tested in the N.C.L.								

Recommendations of the Committee of the Board.	Recommendations of the Board.								
Page 45. 4. p. 45. The Committee noted. 5. p. 45. The Committee recommended that the research scheme on thermodynamic properties of high polymer solutions by Dr. S. R. Palit be approved and the following grant-in-aid be made (upto 31st March 1953 in the first instance): <table> <tr> <td>Equipment.</td><td>Nil</td></tr> <tr> <td>Contingencies.</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (One Junior Scientific Asst.)</td><td>Rs. 1,530 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 2,530 (including allowances)</td></tr> </table> p. 45. The Committee noted.	Equipment.	Nil	Contingencies.	Rs. 1,000	Staff : (One Junior Scientific Asst.)	Rs. 1,530 (including allowances)	Total	Rs. 2,530 (including allowances)	Page 45. 4. p. 45. The Board noted. 5. p. 45. The Board endorsed the recommendation of Committee. 6. p. 45. The Board noted.
Equipment.	Nil								
Contingencies.	Rs. 1,000								
Staff : (One Junior Scientific Asst.)	Rs. 1,530 (including allowances)								
Total	Rs. 2,530 (including allowances)								

17
PROCEEDINGS OF PLASTICS RESEARCH COMMITTEE

Item No.	Particulars.
	7. INVESTIGATION ON MANUFACTURE OF CONTAINERS FOR MOTOR VEHICLE BATTERIES FROM INDIAN ASBESTOS. The Committee was informed that work was still in progress at the N.C.L. on this scheme. Test pieces had been made out of indigenous asbestos and bitumen composition which compared favourably with those of foreign made battery containers. It is proposed to have some battery containers made from this composition with a view to test the same under actual working conditions. Some concerns dealing with the manufacture of battery containers have been approached for testing these compositions. 8. BUSINESS ARISING OUT OF THE SCHEMES CONSIDERED AT THE LAST MEETING. (i) Construction of light-scattering apparatus for the measurement of molecular weight, size and shape of high polymers by Dr. Santi R. Palit. The Committee noted that the above scheme had been sanctioned by the C.S.I.R. (ii) Preparation of synthetic resin for antireasing textiles by Dr. Santi R. Palit. The scheme was referred by the CSIR to the N.C.L. for investigation. The N.C.L. had taken up the work. Different samples of antireased cloth prepared by using urea formaldehyde and melamine-formaldehyde resins were exhibited. The work was carried out on a small scale as well as cottage industry scale. It was pointed out that the antirease property could be improved to greater extent if hot rolls were used instead of flat iron in pressing the cloth. (iii) Ion-exchange resins and study of their physico chemical properties by Dr. B.N. Ghosh. The Committee noted that the C.S.I.R. had postponed consideration of the scheme. (iv) Preparation of alkyd resins from Indian raw materials by Dr. Santi R. Palit. It was pointed out that the 98-99 percent pure phthalic anhydride sent by Shalimar Tar Products Ltd., to the N.C.L. was only 82 percent pure. The Committee noted that the N.C.L. had received suitable phthalic anhydride from other sources and were carrying out work with it. (v) Physical and chemical properties of rubber latex. The Committee noted that the scheme had been terminated with effect from 31st July 1951. (vi) Scheme of research on preparation and properties of high polymers by Dr. S.K.K. Jatkar. The Committee noted that Dr. Jatkar was not interested any further in the work.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 47 7. p. 47. The Committee noted. 8. (i) & (ii) p. 47. The Committee noted. (iii) p. 47. The Committee noted that no revised scheme had been received. (iv), (v) & (vi) p. 47. The Committee noted.	Page 47 7. p. 47. The Board noted. 8. (i) & (ii) p. 47. The Board noted. (iii) p. 47. The Board noted. (iv), (v) & (vi) p. 47. The Board noted.

PROCEEDINGS OF PLASTICS RESEARCH COMMITTEE

Item No.	Particulars.
9.	TERMS OF REFERENCE OF THE P.R.C. The Committee noted and concurred with the terms of reference conveyed by the Secretary, C.S.I.R. The Committee felt that in case a raw material came under purview of two committees, the end use of the raw material should decide which committee was to deal with the matter. 10. PRIORITY LIST OF RESEARCH PROBLEMS IN PLASTICS. For the purposes of discussion the item was divided into two sections : (A) Consideration of Prof. Hohenstein's note, and (B) Consideration of the various schemes suggested by the members. (A) Prof. McBain explained the background against which Prof. Hohenstein had advocated the starting of the polystyrene industry in India. Prof. McBain then went on to point out that as much as 1000 gallons a day of benzene was being wasted, which could be recovered by the coke-oven industry. The raw materials position was discussed. It was pointed out that raw materials were likely to be costly in the beginning. The Committee was informed that the Ministry of Commerce and Industry had under consideration a plan for the establishment of a polystyrene industry in India. The Committee felt that if a polystyrene industry was to be established, it was not necessary to start with a pilot plant demonstration. It was also recommended that the Govt. of India be requested to start the polystyrene industry at an early date and that the Government should arrange to provide the industry with the necessary raw materials as cheaply as possible. (B) The schemes suggested by various members were then considered. (i) Investigation on the use of cheap mineral fillers for phenolic resins, in order to prepare articles which require essentially water and abrasion resistance but are used only once (e. g. a number of articles used by the Defence Services) by Shri N. R. Kamath. The Committee felt that before undertaking the work, the Defence Ministry should be consulted whether they would favour research being undertaken on this problem. (ii) Exhaustive investigations on cotton linters, with a view to utilize the same as a raw material for the (a) manufacture of cellulose derivatives, including regenerated cellulose, (b) filler for urea formaldehyde resins by Shri N. R. Kamath.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 49 9. p. 49. The Committee noted and recommended that the D.S.I.R. be authorised to refer any subject that came under the purview of two or more Committees to the Research Committee which he considered the most appropriate to deal with the particular subject. 10. (A) p. 49. The Committee endorsed the recommendation of the Research Committee. (B) (i) p. 49. The Committee endorsed the recommendation of the Research Committee.	Page 49 9. p. 49. The Board endorsed the recommendation of its Committee. 10. (A) p. 49. The Board endorsed the recommendation of the Research Committee. (B) (i) p. 49. The Board endorsed the recommendation of the Research Committee.

PROCEEDINGS OF PLASTICS RESEARCH COMMITTEE

Item No.	Particulars.
	The Committee felt that the (a) part of the problem came under the purview of the Cellulose Research Committee. Regarding (b) above the Committee recommended that Shri Kamath should prepare a scheme covering both cotton linters and bagasse bleached pulp for the manufacture of alpha-cellulose and its utilisation as a filler. (iii) To develop plasticizers, based on available raw materials, for cellulose nitrate, cellulose acetate, polyvinyl chloride and vinyl chloride copolymers by Shri N. R. Kamath. It was pointed out that there was a need for plasticizers prepared from indigenous raw materials. One such plasticizer, it was stressed was butyl-acetyl ricinoleate. Shri Kamath was requested to prepare a note on this subject. The scheme would then be investigated at the N.C.I., if it was able to include it in its programme of work. (iv) Investigations on the determination of the properties of rigid plastics based on cellulose acetate, polystyrene and polyvinyl chloride, when used under Indian climatic conditions with special reference to physiological action by Shri N.R. Kamath. The Committee decided to postpone consideration of this project as it was not of immediate importance. (v) To study the effect of varying the external conditions of moulding by injection, in relation to the physical and physico-chemical properties of the moulded articles by Shri N. R. Kamath. The Committee felt that the machine manufacturers and moulding powder producers were the proper people to undertake this kind of work. Besides, it would be a costly project. The Committee, therefore, did not consider the scheme further. (vi) Manufacture of para-butyl or amyl phenols by Dr. K.G. Kudva. The Committee recommended that since this material had very small demand, it need not be considered. (vii) Manufacture of bis-phenol-propane by Dr. K.G. Kudva. It was pointed out that this phenol was useful in the preparation of modified phenolics. There was a demand of the order of 100 tons per annum; the material was being imported at present. The Committee recommended that Dr. K.G. Kudva should be requested to prepare a scheme for setting up a pilot plant to manufacture this material. The scheme should then be considered by the P.R.C. and assigned to N.C.I., if they were willing to undertake it.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 51 (ii) p. 49-51. The Committee noted that investigations on cotton linters had already been taken up by the Cellulose Research Committee. It was also recommended that Mr. Kamath be requested to submit a scheme for the manufacture of alpha-cellulose and its utilisation as a filler. (iii) p. 51. It was recommended that Mr. Kamath be requested to submit a note on plasticizers from indigenous raw materials for consideration of the Plastics Research Committee. (iv) p. 51. The Committee noted. (v) p. 51. The Committee agreed with the opinion of the Research Committee. (vi) p. 51. The Committee endorsed the recommendation of the Research Committee. (vii) p. 51. The Committee recommended that Dr. Kudva be requested to prepare a scheme for setting up a pilot plant to manufacture phenol for consideration of the Plastics Research Committee.	Page 51 (ii) p. 49-51. The Board noted and endorsed the recommendation of its Committee. It was further recommended that cotton waste be also included for investigation as a source of alpha-cellulose. (iii) p. 51. The Board endorsed the recommendation of its Committee. (iv) p. 51. The Board noted. (v) p. 51. The Board agreed with the opinion of the Research Committee. (vi) p. 51. The Board endorsed the recommendation of the Research Committee. (vii) p. 51. The Board endorsed the recommendation of its Committee.

PROCEEDINGS OF PALSTICS RESEARCH COMMITTEE

Item No.	Particulars.
	(viii) Manufacture of maleic anhydride by Dr. K.G. Kudva. The Committee recommended that since the demand for maleic anhydride was of the order of the five tons per annum only, the project need not be considered. (ix) Manufacture of pentaerythritol by Dr. K.G. Kudva. The Committee recommended that as the material was rarely being used at present the scheme need not be taken up. (x) Preparation of thermoplastic materials from Indian turpentine oil by Dr. L.M. Yeddnapalli. The Committee was glad to note that Dr. Yeddnapalli was carrying out work on this subject. Dr. Yeddnapalli agreed to submit a scheme for the consideration of the Committee. Dr. Yeddnapalli also expressed a desire to submit schemes for preparing materials such as maleic anhydride from rosin etc. (xi) Synthetic phenol from benzene by Shri G.N. Parikh. The Committee noted that the Department of Chemical Technology had carried out considerable work on the chlorination process. It was pointed out that the N.C.L. was also carrying out work on this subject. (xii) Manufacture of furfural from agricultural waste by Shri G.N. Parikh. It was pointed out that the C.S.I.R. had already worked out this scheme. The Committee also noted that Bharat Starch Products were producing furfuraldehyde commercially. (xiii) Manufacture of ethylene from ethyl alcohol by Shri G.N. Parikh. It was pointed out that work had already been done on this subject at the Indian Institute of Science, Bangalore. Different aspects of this scheme were being investigated also at the N.C.L. Poona, and at the Shri Ram Institute for Industrial Research, Delhi. The Committee agreed to request the Chemical Research Committee for the latest information on the subject. (C) The question of priorities was then discussed. It was pointed out that the manufacture of raw material was of prime importance and unless these were produced on a large scale substantial progress could not be achieved. The Committee was informed that the Sindri factory will have a plant capable of producing 1,500 tons of formaldehyde and about 10,000 tons of urea. Although the bulk of the production of urea was likely to be used as fertilizer, sufficient quantities could probably be spared for the plastics industry. It was pointed out that the demand for thermosetting resins in India was about 3,000 tons per annum. The Committee, therefore, decided to request the proper Ministry of the Government of India to take steps to put these two plants into operation at an early date.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 53. (viii) p. 53. The Committee endorsed the recommendation of the Research Committee. (ix) p. 53. The Committee endorsed the recommendation of the Research Committee. (x) p. 53. The Committee recommended that Dr. Yeddnapalli be requested to submit schemes on (i) preparation of thermoplastic materials from turpentine oil, and (ii) preparation of maleic anhydride from rosin, for consideration of the Research Committee. (xi) p. 53. The Committee noted. (xii) p. 53. The Committee noted. (xiii) p. 53. The Committee noted that the problem had already been taken up for investigation under the Chemical Research Committee. (C) p. 53. The Committee endorsed the recommendations of the Research Committee.	Page 53. (viii) p. 53. The Board endorsed the recommendation of the Research Committee. (ix) p. 53. The Board endorsed the recommendation of the Research Committee. (x) p. 53. The Board endorsed the recommendation of its Committee. (xi) p. 53. The Board noted. (xii) p. 53. The Board noted. (xiii) p. 53. The Board noted. (C) p. 53. The Board endorsed the recommendations of the Research Committee.

PROCEEDINGS OF PLASTICS RESEARCH COMMITTEE

Item No.	Particulars.
	11. NOMINATION OF P.R.C. REPRESENTATIVE ON PLASTICS SECTIONAL COMMITTEE OF THE I.S.I. (C.D.C. 17). Dr. Verman explained the formation, activities and mode of work of the Plastics Sectional Committee of the I.S.I. and suggested that it would be more appropriate if some member other than himself was to represent the P.R.C. on the I.S.I. Committee. The Committee, however, confirmed Dr. Verman's nomination as representative of the P.R.C. on the C.D.C. 17. 12.. UPGRADING OF THE POST OF TECHNICAL ASSISTANT (JUNIOR) TO THAT OF TECHNICAL ASSISTANT (SENIOR). The Committee noted that the Technical Assistant had been upgraded by the B.S.I.R. on the recommendation of the Committee. 13. ANY OTHER BUSINESS. (i) Dr. Verman informed the Committee that he was going on a tour to the U.S.A. for a period of six to seven weeks from June 1952. He offered to give assistance to the members if they have any problems for investigation there. The Committee noted Dr. Verman's offer. (ii) Dr. Kapur informed the Committee that he had now available in the N.C.L. such quantities of monomers as were ordered on recommendation of the P.R.C. after ascertaining the requirements of various laboratories in India. According to Dr. Kapur, it appeared that some of the laboratories were no longer interested in the monomers they had originally indicated as required. The Committee felt that the stock of monomers should be maintained by the N.C.L. and information regarding the availability of the types of monomers, quantities and prices may be circulated to members of this Committee as also to such laboratories as might be likely to be interested.
XXIII	Proceedings of the Mining Research Committee (Convenor : Dr. J. W. Whitaker). 1. A meeting of the Mining Research Committee was held on May 23, 1952 at Calcutta. 2. Mr. N. Barraclough, who presided, gave a brief history of Mining Research Committee and dealt on the necessity of the establishment of a Mining Research Station for India. He then referred to the meeting of the Mining Research Technical Committee held on March 25, 1952 and opened the discussion on the decisions arrived at the M.R.T.C. meeting. He also drew the members' attention to the proposal to rename the Technical Committee as Mining Research Technical Committee in preference to the original name Technical Advisory Sub-Committee. The change was approved.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 55. 11. p. 55. The Committee recommended that Dr. Verman's nomination on behalf of the Plastics Research Committee on the Plastics Sectional Committee of the Indian Standards Institution be approved. 12. p. 55. The Committee noted. 13 (i) p. 55. The Committee noted. (ii) p. 55. The Committee noted that bulk quantities of a number of monomers had been obtained by the C.S.I.R. and kept in the N.C.L. for distribution to interested research workers in India at cost price. Item XXIII p. 55. Mining Research Committee. 1. p. 55. The Committee noted. 2. p. 55. The Committee noted that the Mining Research Technical Sub-Committee was constituted for the specific purpose of advising on the technical aspects of the plan for the Mining Research Station. Since this had been done, it was recommended that the Sub-Committee be abolished.	Page 55. 11. p. 55. The Board endorsed the recommendation of its Committee. 12. p. 55. The Board noted. 13 (i) p. 55. The Board noted. (ii) p. 55. The Board noted. Item XXIII p. 55. Mining Research Committee. 1. p. 55. The Board noted. 2. p. 55. The Board noted and endorsed the recommendation of its Committee.

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars.
	3. Dr. M. S. Krishnan asked whether the M. R. C. would deal with coal mining problems alone. The Chairman stated that the research should be applicable to all types of mining in India. Dr. Krishnan then suggested that some representatives should be chosen to serve on the Committee from other mining groups, for example, metal mining from the Kolar Gold Mines. Representatives may also be chosen from the mica, copper, iron and steel and zinc mining industries. Dr. Krishnan thought that the Mining Research Station should also deal with dust hazards, rock bursts, mine temperatures, mine lighting etc., in mica, metal and other mines. The members agreed to this suggestion, and it was decided that the Mining Research Committee might well have a few representatives drawn from the metal and other mining industries in the country. Sub-Committees would, no doubt, be appointed later to deal with research in the specific fields. Dr. Whitaker suggested that the representatives should be nominated through Societies and Associations, for example, Mining Geological and Metallurgical Institute of India and other bodies. As the number of the members in the Mining Research Committee was already large, it was recommended that at present only two representatives, one from the metal mining industry and the other from the mica mining industry should be sought. 4. Mr. L. S. Corbett then raised the question of financing the proposed Mining Research Station. He said that as the matter stood, it seemed that the Coal Board would have to finance the Mining Research Station, and he wondered whether the metal mines and others should be represented. Dr. Krishnan thought that even if the Coal Board financed the Mining Research Station entirely, the metal mines should have representation in the Mining Committee. The suggestion was made that the finance should partly be borne by the Coal Board and partly by the C.S.I.R. and that there should be close co-operation between these two Departments. Dr. Lahiri thought that about 75% of the finance should come from the Coal Board and 25% from the C.S.I.R. Dr. Krishnan pointed out that according to the latest figures, out of the total value of India's production of Rs. 80 crores, coal sales amounted to only Rs. 45 crores; and that on this reckoning the ratio should be 50 : 50. In the discussions that followed, it was pointed out by Dr. Whitaker that the ratio of 75 : 25 was only a tentative one, and it would be modified by the authorities if they thought fit. The Committee provisionally recommended that the finance of the Mining Research Station should be borne by the Coal Board and the C.S.I.R. on a 75 : 25 ratio. Mr. Corbett observed that the Coal Board had no funds as yet, from which the Mining Research Station could be financed, but hoped that there would be no difficulty in getting funds once the recommendations of the Committee regarding the Mining Research Station were approved officially by Government.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 57. 3 p. 57 The Committee noted that the Mining Research Committee already consisted of 15 members. Since Mining Research would cover all types of mining, the Committee considered that representation should be provided for metal and mica mining also on the Committee. It was, therefore, recommended that the Mining Research Committee be reconstituted into a more compact body with the following : 1. Mr. N. Barraclough, Chief Inspector of Mines. Chairman 2. Mr. L. S. Corbett, Chairman, Coal Board. Member 3. Dr. V. R. Khedker, Director, Indian Bureau of Mines. " 4. Dr. R. P. Sinha, Principal, Indian School of Mines. " 5. Dr. J. W. Whitaker, Director, Fuel Research Institute. " 6 & 7. Two Representatives from the Coal Mining Associations. 8. One Representative from the Metal Mining Industry. 9. One Representative from the Mica Mining Industry. 10. D.S.I.R. (Ex-officio) 4. p. 57. The Committee noted that the Coal Board was already in receipt of excise duties from the coal industry and agreed with the Research Committee that part of the finances of the proposed Mining Research Station should be made available from the Coal Board. It was recommended that the D.S.I.R. be authorised to place the proposal before the Coal Board for consideration. The Committee discussed, in this connection, the reply from the Coal Board as regards allocation of money from their funds for Research at the Fuel Research Institute. It was recommended that the Coal Board should again be requested to set apart an appreciable sum of money from their funds for scientific research on coal.	Page 57. 3. p. 57. The Board endorsed the recommendation of its Committee. 4. p. 57. The Board was in general agreement with its Committee and further recommended that the Coal Board may be requested to make a contribution in the specific ratio suggested by the Research Committee.

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars
	5. Dr. V. R. Khedker pointed out that the coal mining industry was exempted from the duty on explosives and that there was a rebate of 37½ per cent, but the metal mining people are not exempted from the duty. He wanted to know whether such matters would come under the purview of the Mining Research Committee. The Chairman replied that the Committee would deal only with mining research in India, and with the technical problems involved. The fiscal policies of the Government did not come under the purview of the Committee. 6. Regarding representation on the M.R.T.C., the suggestion of Dr. Khedker that the Bureau of Mines should have one representative, was agreed to by the members. Mr. George held the view that all the Mining Associations should have members on the M.R.T.C. to which the Chairman replied that the M.R.T.C. should be a small body of technical experts; if all the Mining Associations were to have members, it would be impracticable to conduct the technical business efficiently. Dr. Krishnan further supported the view that for membership of the M.R.T.C., the technical competence of the members should be judged. The advantages of having a small Committee were outlined by Dr. Lahiri. It was recommended that the Bureau of Mines may nominate one member to the M.R.T.C. 7. (i) Arising out of the discussions on the short term programme of the M.R.S., the Committee held that there should not be a rigid order of priority. Research on all the five items was equally important. The actual rate of advance of the work would depend on the availability of the equipment, personnel, and other facilities. (ii) Mr. A.B. Guha pointed out that research on stowing should be done by the Coal Board and there should be no duplication of the work at the M.R.S. Dr. Whitaker mentioned that research on pneumatic conveying of coal and other allied problems was being carried out at the F.R.I. as part of the fuel work of the Institute; co-operation might be advantageous, but he did not press it. The Chairman pointed out that the Coal Board scientists engaged on stowing etc., should have very close co-operation and liaison with those of the F.R.I. and the M.R.S. Mr. L.J. Barraclough then referred to the researches being carried out in U.K. on mining problems, and suggested that a Sub-committee should be appointed to deal with the subject of stowing. The Committee recommended that regarding stowing, the Coal Board should submit to the M.R.T.C. any problems in which the M.R.S. could help. (iii) Staff:— Mr. Guha expressed doubts whether a competent mining man would be available on the salary scale of an Assistant Director. Dr. Krishnan observed that if necessary, a higher start could be given to a suitable man. 8. The Committee approved the plan for the establishment of the Mining Research Station as outlined by the Technical Sub-Committee and recommended that the Council of Scientific and Industrial Research may accept the plan.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 59. 5. p. 59. The Committee recommended that the question raised by Dr. Khedker be brought to the notice of the Government of India for examination. 6. p. 59. The Committee noted that no action was necessary since the M.R.T.C. was to be abolished. 7. p. 59. The Committee generally agreed with the opinion of the Research Committee and endorsed its recommendations.	Page 59. 5. p. 59. The Board endorsed the recommendation of its Committee. 6. p. 59. The Board noted. 7. p. 59. The Board endorsed the recommendations of the Research Committee.

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars.
	A PLAN FOR THE MINING RESEARCH STATION. 1. MINING RESEARCH IN U. K. & U.S.A. Problems relating to safety in coal mining have long exercised the minds of those engaged in the industry. Among such problems, that of the behaviour of coal dust in mine explosions has proved to be one of the most difficult. The Royal Commission on Mines in U.K. decided in 1906 that research on coal dust explosions involving large-scale experiments was essential. Experiments were eventually undertaken by the Mining Association of Great Britain in 1908. In 1911, an Executive Committee known as "Explosions in Mines Committee" was appointed by the Secretary of State of the Home Department of U.K. to investigate further the use of incombustible dust as a preventive of coal dust explosions with a view to its adoption in practice. Ultimately, this led to the establishment of an experimental station for prosecution of research, both laboratory and large-scale, on coal dust and other problems relating to safety in mines in U.K. In 1924, the Research Station at Buxton was set up for an expanded programme of research on safety in mines. The general description and programme for the Research Station have been given in the Safety in Mines Research Board paper No. 34 (Safety in Mines Research Station, Buxton—A description). In the U.S. the Explosives and Coal Research Section of the Bureau of Mines deals with the same problems. In general, the subjects of research in both these Mining Research Stations comprise :— Mine Dusts, Electrical Researches, Mine Gases, Mining Explosives and Shot-firing, Haulage, Winding & Wire Ropes, Metallurgy, Supports, Testing of Equipment, Design and Development of Apparatus, and a highly organised Technical Information Section attends to the duty of diffusion of knowledge among the mining personnel. 2. ORIGIN OF THE PROPOSAL. The Coal Mining Committee of India of 1937 and the Coalfields Committee of 1946, both recommended the setting up of a Coal Research Board for initiating and directing research on many pressing problems, such as classification of Indian coals, cleaning and blending, soft coke manufacture, etc., as well as ventilation and lighting in mines, research on safety, stowing in mines and stowing material; methods of working and standardisation of plant, apparatus, appliances and materials. As a result of the recommendations and the efforts of the C.S.I.R. the National Fuel Research Institute was inaugurated in 1945, and its laboratories opened in 1950. The finances granted to the Institute are not sufficient for covering the work of Mining Research Station, although the need for such a Station has been increasingly felt.

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

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars.
	Mining of coal is the largest single unit of the mining industry of India, employing nearly 3000,000 persons and contributing a total of Rs. 45 crores per annum out of Rs. 80 crores value of minerals raised in India. Metal mining also has its problems, e.g. special health hazards from dusts and the problems of deep mining as in the Kolar Gold Mines. The number of small and large mines working coal is nearly 1,000. Research on safety and other aspects of mining is vital for a healthy development of the mineral industry of the country, an industry on which so many other industries depend. In May 1948, a formal proposal for the establishment of a Mining Research Station was made to the then Ministry of Works, Mines and Power by Dr. J.W. Whitaker, who was then acting temporarily as Principal of the Indian School of Mines. The W.M.P. Ministry forwarded the recommendations to the Council of Scientific & Industrial Research for action. The Director, Bureau of Mines, endorsed the proposal, and suggested that a Mining Research Station might be attached to the Fuel Research Institute, to save expenditure, both capital and recurring. It was also proposed that close liaison be maintained with the Indian Bureau of Mines. The Ministry of Finance had also accepted the proposal in principle. 3. MINING RESEARCH COMMITTEE CONSTITUTED. The Council of Scientific & Industrial Research appointed a Committee for examining the functions of the proposed Research Station and for preparing a detailed scheme giving the capital and recurring expenditure involved. The Committee, later called the Mining Research Committee included the following :— Representative of the Ministry of Work, Mines & Power. Representative of the Ministry of Labour. Director, Scientific & Industrial Research. Director, Bureau of Mines. Chief Inspector of Mines. Director, Fuel Research Institute. Chief Mining Engineer attached to the Coal Commissioner. The Principal, Indian School of Mines and Applied Geology. Mr. J.N. Mukherjee, Mining Engineer, Calcutta. The first meeting of this Committee was held on the 6th August 1949 at Calcutta. The Committee proposed that a Technical Advisory Committee be appointed to go into the question of site as well as for preparing a detailed plan for the establishment of the Station.

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

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars.
	The Board of Scientific & Industrial Research, after considering the views of the Committee recommended that the Mining Research Committee be requested to "take note of the ruling by the Government of India, when the reference was originally made to the Council of Scientific & Industrial Research that the Mining Research Station should be attached to the Fuel Research Institute". The B.S.I.R. also expanded the original Mining Research Committee in March 1950 by co-opting the following : Director, Geological Survey of India. Chairman, Coal Mines Stowing Board (later Chairman, Coal Board). Representative of the Indian Colliery Owners' Association. Representative of the Indian Mining Federation. Representative of the Indian Mine Managers' Association. Representative of the National Mine Managers' Association. Dr. A. Lahiri, Assistant Director of the Fuel Research Institute was co-opted as a member and appointed as Secretary. In the meantime, the Director, Fuel Research Institute and the Assistant Director, both of whom went on deputations to U.K. and U.S.A. respectively, were requested to collect information and data from the Mining Research Stations of the respective countries, and prepare draft plans for consideration of the Technical Sub-Committee. In March 1952, the Technical Sub-Committee was reconstituted as the Mining Research Technical Committee with Mr. L.J. Barraclough, Chief Mining Engineer, New Beerbhoom Coal Company as Chairman. The other members were : Chairman Coal Board; Chief Inspector of Mines; Principal, Indian School of Mines; Director Fuel Research Institute; Mr. S. C. Ghose, Superintendent of Collieries, Tata Iron & Steel Co. Ltd., and Dr. A. Lahiri as Secretary. 4. FUNCTIONS The Committee agreed to the programme of work outlined by the main Committee and recommended that the research work should extend to all types of mines or mining in India. A long-term programme of research for the Mining Research Station, which is given below, was approved. LONG TERM PROGRAMME OF WORK SAFETY & HEALTH DIVISION. (i) Ventilation. (a) Quality of mine-air, air and gas analysis, testing and control.

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

PROCEEDINGS OF MINING RESEARCH COMMITTEE

<i>Item No.</i>	<i>Particulars.</i>
	(b) Temperature and humidity control. (c) Air pressure surveys and leakage. (d) Fans and blowers, auxiliary ventilation : efficiency and types. (e) Mine dusts: effects of coal and rock dusts on miner's health : dust suppression.
	(ii) <i>Lighting.</i> (a) Lamps: candle power, design, testing. (b) Electrical fixed lighting for gassy mines. (c) Light absorption and reflexion properties of coals, rocks and their dusts. (d) Special surface lighting for hand-picking belts, etc.
	EXPLOSIVES, EXPLOSIONS, & FIRE DIVISION.
	(i) <i>Explosives.</i> (a) Testing of explosives, detonatory, and firing apparatus. (b) Efficiency of explosives. (c) Controlled breakage of coal by explosives. (ii) <i>Explosions & Fires.</i> (a) Explosibility of coal dusts. (b) Stone dusting and other methods for prevention of mine explosions. (c) Control and prevention of mine fires. (d) Flame propagation. (e) Oxidation and spontaneous combustion in seams and in storage. (f) Fire-damp—emission, permeability of seams. (g) Treatment to make Brattice, timber, etc. non-flammable.
	MINING DIVISION.
	(i) <i>Strength of Rocks.</i> (a) Strength of pillars in shallow and deep mines. (b) Roof support and roof control. (c) Strength of strata. (d) Rheological properties of coal. (ii) <i>Subsidence.</i> - Study of nature and conditions of subsidence, control of subsidence.

<i>Recommendations of the Committee of the Board.</i>	<i>Recommendations of the Board.</i>

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars.
	(iii) <i>Stowing in Mines.</i> (a) Hydraulic stowing with sand and other materials. (b) Flow of solids in mixture of water and air in pipe lines. (c) Measurement of pressure in stowing pipes, and throw of materials. (d) Effect of particle size and density and nature on stowing and packing. (e) Pneumatic stowing. (f) Corrosion and wear in pipe lines : effect of nature of solids and water. (iv) <i>Haulage.</i> (a) Efficiency and safety of haulage devices : rope haulage, conveyor haulage, diesel locos (testing and exhausts) electric locos, etc. (v) <i>Mining methods.</i> (a) Pillar and stall size, height of pillars, width and height of galleries, extent of development. (b) Long-wall method : application in thick and thin seams and in deep mines. (c) Deep-mining special problems, rock temperatures, geothermic gradients. (vi) <i>Preparation of coal for market.</i> (a) Crushing, screening and sizing. (b) Dust proofing, oiling. (c) Washing, and other methods of coal purification. TESTING DIVISION (FOR SAFETY) (a) Machinery. (b) Signalling & Telephoning Equipment. (c) Shotfiring devices. (d) Wire ropes for haulage and winding. (e) Drawgear and cappings. (f) Safety appliances for haulage and winding. (g) Lamps and electrical appliances. (h) Certification of above. UNDERGROUND GASIFICATION OF COAL.

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

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars.
	SHORT TERM PROGRAMME OF RESEARCH. The Technical Sub-Committee felt that an immediate beginning should be made, in view of several pressing problems, and adopted the following short-term programme for investigation : (a) <i>Mine Ventilation, Mine Gases, and Mine Dusts :</i> Priority should be given to work on dust control and dust hazards in mines. The Chief Inspector of Mines invited attention to the fact that Government of India had already constituted an Industrial Health Research Committee for factories which would probably extend its work to mines. He recommended that close touch should be kept with the activities of the Industrial Health Research Committee by the M.R.S. Investigations into the dust hazards as affecting the health of the miners should be given No. 1 priority in the programme of the M.R.S., and recommended that immediate steps should be taken to obtain apparatus and equipment for conducting investigations and research on dust hazards in the mines. (b) <i>Mine Lighting—Improvement of Miners' Lamps :</i> Improvement of mine lighting with particular reference to the improvement of miners' open flame lamps was agreed upon as another problem to be given priority, and the Committee were in agreement that it was an urgent necessity to devise ways and means to improve the lighting efficiency and the flame candle power and to reduce the smoke output of the open type oil lamps used by miners in naked light mines. It was recommended that the attention of Indian glass manufacturers should be drawn to the desirability of safety lamp glasses being made in India to approved ISI specifications. It was further recommended that the manufacturers of safety lamp glasses be approached and the co-operation of the Central Glass & Ceramic Research Laboratory at Calcutta should be sought in this work. (c) <i>Spontaneous Combustion:</i> It was considered that the above item of research could be undertaken in the existing F.R.I. buildings, provided that sanction of the Council of Scientific & Industrial Research was obtained. Dr. Whitaker pointed out that preliminary work on the spontaneous combustion of Indian coals had already begun at the F.R.I. He further explained that this research work on spontaneous combustion was being conducted not only in the laboratory but also in actual field in coal stacks on the surface. He suggested that the work might be extended by the M.R.S. to underground conditions with a view to determining of underground fires. This work should also include methods of limiting spontaneous combustion, e.g. the best design of stacks, ventilation conditions, use of inhibitors, etc.

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

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars
	(d) <i>Testing of Electrical Equipment & Testing of Mechanical Equipment.</i> The Chief Inspector of Mines and the Coal Commissioner pointed out the desirability of establishing facilities for the testing of electrical mining equipment for safety and with a view to granting certificates similar to those granted by the Ministry of Fuel & Power, U.K. It was recommended that the Electrical Inspector of Mines Department be consulted for details, etc. It was further recommended that the Indian Standards Institution should be approached when drawing up standard specifications for the test so that the certification might carry their imprimatur. Safety lamp glasses might also be certified by the I.S.I. (e) The Committee decided that the short term programme should be given priority. (i) Dust hazard with particular reference to health of miners, ore-dressers, etc. (ii) Mine lighting : (a) safety lamp glasses and (b) improving the efficiency of open lamp lighting. (iii) Spontaneous combustion—surface stacks of coal and underground. (iv) Testing of electrical apparatus. (v) Testing of mechanical apparatus. (f) The Committee also felt that some priority should be given to experimental work on the conveying of solids to be used for stowing, and to roof control studies with and without stowing. The Committee agreed that the testing of mechanical appliances, e.g. ropes and drawgear, should also be undertaken, and that the necessary equipment should be budgeted for. Later, work should include compressibility of the various stowing materials, geothermic gradients, explosives, and mine atmospheres. A more detailed research programme should be submitted in due course. FINANCES 1. It had been suggested that the major part of the finance should come from a cess on coal : until action has been taken by the Government in this direction, no further progress can be made. The situation has however been eased by enactment of the Coal Mines (Conservation & Safety) Act, 1952. Under the Act, powers have been given to the newly created Coal Board to levy a cess for research on coal in all its aspects. 2. The Technical Sub-Committee also recommended that the Director, Fuel Research Institute would also be the Director of the new Station, and that a Planning Officer, who should be a Mining Engineer, in-charge of one section (preferably dealing with Mine Ventilation, Mine Gases and Mine Dusts) should be immediately appointed.

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

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars.																
	3. The Committee then considered the proposed layout for M.R.S. as suggested by the architects. They also noted that there would be a saving of about Rs. 15 lakhs in equipment and workshop facilities etc., by the amalgamation of M.R.S. with F.R.I. 4. For the first three years the following capital and recurring expenditure was then approved. A. CAPITAL EXPENDITURE. Most of the laboratory facilities exist at the F.R.I. and only rooms for large scale testing equipment, storage, etc. will be necessary. For such work, a building of the type of the Technological Block of the F.R.I. will be suitable. On the basis of recent estimates, the capital expenditure for the building and services will be roughly as follows : <table> <tr> <td>Building including inside electrical, sanitary fittings, furniture etc</td><td>... Rs. 6.2 lakhs.</td></tr> <tr> <td>Capital grant for special testing equipment in addition to the equipment already available at F.R.I.</td><td>... Rs. 5.0 lakhs.</td></tr> <tr> <td></td><td><u>Rs. 11.2 lakhs.</u></td></tr> </table> By amalgamation of the M.R.S. with the F.R.I. there will be a saving of at least Rs. 6 to 8 lakhs in building and Rs. 15 lakhs in equipment, workshop facilities etc. As per estimate, at present a total capital grant of Rs. 11.2 lakhs and a recurring grant of Rs. 2.00 lakhs per annum will be required for the first three years. The actual recurring expenditure during the first year will be considerably lower. B. RECURRING EXPENDITURE. <table> <tr> <td><i>Staff</i></td><td><i>Duties & subsidiary staff required</i></td></tr> <tr> <td>1. Mining Engineer (Rs. 600 to Rs. 1,500) with competent mining and scientific background.</td><td>The Mining Engineer shall be the Planning Officer to be appointed in charge for mine ventilation, spontaneous combustion, fire control, etc. The following staff are required : 1 S.S.A., 3 J.S.A., 2 L.A.</td></tr> <tr> <td>2. Mechanical &/or Electrical Engineer (Rs. 350-850)</td><td>Electrical & Mechanical Testing Section. 1 S.S.A., 2 J.S.A., 2 Mechanics and 2 Helpers.</td></tr> <tr> <td>3. One Senior Chemical Engineer (FRI)</td><td>In charge for flame studies. explosives, coal breakage, coal dusts etc. 1 S.S.A., 2 J.S.A., 1 L.A.</td></tr> <tr> <td>4. Analytical Section (FRI)</td><td>3 J.S.A., 1 L.A.</td></tr> </table>	Building including inside electrical, sanitary fittings, furniture etc	... Rs. 6.2 lakhs.	Capital grant for special testing equipment in addition to the equipment already available at F.R.I.	... Rs. 5.0 lakhs.		<u>Rs. 11.2 lakhs.</u>	<i>Staff</i>	<i>Duties & subsidiary staff required</i>	1. Mining Engineer (Rs. 600 to Rs. 1,500) with competent mining and scientific background.	The Mining Engineer shall be the Planning Officer to be appointed in charge for mine ventilation, spontaneous combustion, fire control, etc. The following staff are required : 1 S.S.A., 3 J.S.A., 2 L.A.	2. Mechanical &/or Electrical Engineer (Rs. 350-850)	Electrical & Mechanical Testing Section. 1 S.S.A., 2 J.S.A., 2 Mechanics and 2 Helpers.	3. One Senior Chemical Engineer (FRI)	In charge for flame studies. explosives, coal breakage, coal dusts etc. 1 S.S.A., 2 J.S.A., 1 L.A.	4. Analytical Section (FRI)	3 J.S.A., 1 L.A.
Building including inside electrical, sanitary fittings, furniture etc	... Rs. 6.2 lakhs.																
Capital grant for special testing equipment in addition to the equipment already available at F.R.I.	... Rs. 5.0 lakhs.																
	<u>Rs. 11.2 lakhs.</u>																
<i>Staff</i>	<i>Duties & subsidiary staff required</i>																
1. Mining Engineer (Rs. 600 to Rs. 1,500) with competent mining and scientific background.	The Mining Engineer shall be the Planning Officer to be appointed in charge for mine ventilation, spontaneous combustion, fire control, etc. The following staff are required : 1 S.S.A., 3 J.S.A., 2 L.A.																
2. Mechanical &/or Electrical Engineer (Rs. 350-850)	Electrical & Mechanical Testing Section. 1 S.S.A., 2 J.S.A., 2 Mechanics and 2 Helpers.																
3. One Senior Chemical Engineer (FRI)	In charge for flame studies. explosives, coal breakage, coal dusts etc. 1 S.S.A., 2 J.S.A., 1 L.A.																
4. Analytical Section (FRI)	3 J.S.A., 1 L.A.																

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

PROCEEDINGS OF MINING RESEARCH COMMITTEE

Item No.	Particulars.
5. Photography (FRI)	1 J.S.A.
6. X-ray & Spectroscopy (FRI)	1 S.S.A.
7. Petrology (FRI)	1 S.S.A.
8. Drawing Office (FRI)	2 Draughtsmen
9. Workshop (FRI)	2 Foremen (one electrical & one mechanical).
10. Administration (FRI)	1 Asst. in charge, 1 Accountant, 1 Steno., 1 Typist & 1 Storekeeper.
Asst. Director (Mining Engineer) ...	Rs. 800 p.m.
Sr. Scientific Officer (Engineer) ...	500 "
S.S.A. × 5 ...	1,500 "
J.S.A. & Draughtsmen × 13 ...	2,600 "
Foremen × 2 ...	300 "
Attendants × 8 ...	800 "
Office ...	1,000 "
D.A., P.F. etc. ...	7,500 " 1,500 "
	9,000 × 12 = 1,08,000 per annum.
Staff ...	Rs. 1,08,000
Experimental ...	50,000
T.A. ...	10,000
Transport ...	10,000
Contingencies ...	10,000
	Rs. 1,88,000 per annum.
The recurring expenditure will grow to the amount of Rs. 2 lakhs per annum.	
XXIV	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 April 6, 1952 at Bangalore.
	2. The Chairman reported that the following schemes had been recommended for renewal for 1952-53 :
	(i) Scheme on 'Development of gas turbine and jet propulsion unit', by Principal S.R. Sen Gupta.
	(ii) Scheme on 'Hot air engines and their development', by Prof. H. A. Havemann.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 77 8. p. 59-77. The Committee generally agreed with the proposals made by the Mining Research Committee with regard to the long term and short term programme of research and also the details of the staff and expenditure for the proposed Mining Research Station. The Committee recommended that the plan for the Mining Research Station be approved and necessary funds made available as early as possible for the appointment of the Officer-in-Charge of the Station so that work may be started soon. The Committee also recommended that the Govt. be requested to expedite sanction of the necessary additional funds for the establishment of the Mining Research Station.	Page 77. 8. p. 59-77. The Board endorsed the recommendations of its Committee.
Item XXIV Internal Combustion Engines Research Committee. 1. p. 77. The Committee noted. 2. p. 77. The Committee noted.	Item XXIV Internal Combustion Engines Research Committee. 1. p. 77. The Board noted. 2. p. 77. The Board noted.

PROCEEDINGS OF INTERNAL COMBUSTION ENGINES RESEARCH COMMITTEE

Item No.	Particulars.
	3. The Chairman reported the transfer of the scheme on 'Development of heavy duty parts of internal combustion engines' to Prof. M S. Thacker and Prof. H. A. Havemann. Prof. Thacker reported that work on the above scheme had been started in the Mechanical Engineering Section of the Power Engineering Department under the guidance of Dr. A. Ramachandran and Mr. M. R. K. Rao of the I. C. E. Department. 4. The Chairman reported that the scheme on 'Electro-polishing of bearing surfaces in relation to ferrous metals and alloys used in mechanical and internal combustion engineering' had been sanctioned by the C.S.I.R. on the recommendation of the Metals Research Committee. Prof. Brahm Prakash reported that preliminary trials on polishing metal surfaces had started. He said that the services of a skilled mechanic for polishing were necessary. Prof. M S. Thacker accepted the suggestion of the Chairman that a skilled mechanic might for the time being be provided by the Indian Institute of Science. 5. REPORTS OF WORK DONE ON THE SCHEMES SINCE THE LAST MEETING OF THE COMMITTEE: (i) 'Development of gas turbines and jet propulsion unit', by Principal S.R. Sen Gupta. The Committee considered a note from Principal Sen Gupta regarding the 'Contingencies' grant of Rs. 1,000 only sanctioned for the scheme. It was explained that the work had come to a stage when working expenses (cost of fuel, cost of material, etc.) were likely to be considerably on the increase. The investigator had estimated that a sum of nearly Rs. 10,000 would be required during the current year. The sum of Rs. 1,000 would not meet the working expenses even for part of the year. Prof. Thacker explained how it was necessary to have a higher 'Contingency' grant in all engineering research schemes where the working expenses for making various castings and machine parts and the expenses involved in running a series of trials on a power unit like the gas turbine would be very high. The Committee after detailed discussion recommended that increased grants under 'Contingencies' should be sanctioned for engineering research schemes. Where it was not possible to make increased contingency grant, the Committee felt that a special grant under the head 'Working expenses' should be made for engineering research schemes. With regard to Dr. S. R. Sen Gupta's scheme, the Committee recommended that the grant under 'Contingencies' should be increased to at least Rs. 5,000 as against the sanctioned amount of Rs. 1,000 for this year.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 79. 3. p. 79. The Committee noted. 4. p. 79. The Committee noted. 5. (i) p. 79. The Committee was in general agreement with the Research Committee that engineering research schemes require higher contingent grant. The Committee was, however, of the opinion that contingent grant for each scheme should be considered on the merits of the scheme. The Committee noted that the D.S.I.R. had taken necessary departmental action to sanction an additional grant of Rs. 1,000 to Dr. Sen Gupta for the current year. It was recommended that the D.S.I.R. be authorised to obtain details of Dr. Sen Gupta's further requirements and sanction such additional funds as may be needed not exceeding a total of Rs. 5,000 for the whole year 1952-53.	Page 79. 3. p. 79. The Board noted. 4. p. 79. The Board noted. 5 (i) p. 79. The Board agreed with the opinion of its Committee, and endorsed its recommendation.

PROCEEDINGS OF INTERNAL COMBUSTION ENGINES RESEARCH COMMITTEE

Item No.	Particulars.												
	(ii) 'Hot air engines and their development' by Prof. H. A. Havemann. The Chairman suggested that exact numerical data on various aspects of the problem should be collected so as to make possible the building of a proto-type which could later be put into mass production. 6. A report from Prof. H.A. Havemann on the work undertaken in the I.C.E. Laboratory of the Indian Institute of Science, with regard to instruction and research in gas turbines, for which a grant had been made by the Ministry of Education, was recorded. Prof. Havemann brought to the notice of the Committee that this scheme had now progressed considerably and it was necessary to obtain further grants both for capital and recurring expenditure for increased staff and tests on combustion chambers and turbines blades. The Chairman informed the Committee that the question was being considered by the Standing Advisory Committee to the I.C.E. Department and suitable recommendations would be made therefrom to the Ministry of Education. 7. Research scheme on 'Design and development of a combustion chamber for high-speed heavy duty transport vehicles' by the Secretary to the Committee. [Note :--Combustion chamber design is usually patented and heavily guarded by manufacturers abroad. With the industry for single cylinder diesel engines for power plant purposes well established it is proposed to consider the next stage of development namely multicylinder engines for transport power plants. For undertaking the manufacture of engines there is a serious handicap in regard to the combustion chamber. The object of the scheme is to develop a combustion chamber which can be incorporated by Indian manufacturers in their engines. The scheme is likely to take three years for completion and can be taken up in the Bangalore College of Engineering or the Indian Institute of Technology, Khargpur or in one of the industrial firms. The following grant has been asked for :— <table> <tr> <td>Equipment. (Spread over 3 years)</td><td>Rs. 20,000 to 25,000</td></tr> <tr> <td>Contingencies (per year).</td><td>Rs. 5,000</td></tr> <tr> <td>Staff :</td><td>Rs. 5,400 (plus allowances.)</td></tr> <tr> <td colspan="2">(One Senior Research Assistant in the scale of Rs. 250-25-500, One Laboratory Assistant and one Draftsman).</td></tr> <tr> <td>Total ...</td><td>Rs. 30,400 to Rs. 35,400</td></tr> <tr> <td></td><td>(plus allowances)</td></tr> </table>	Equipment. (Spread over 3 years)	Rs. 20,000 to 25,000	Contingencies (per year).	Rs. 5,000	Staff :	Rs. 5,400 (plus allowances.)	(One Senior Research Assistant in the scale of Rs. 250-25-500, One Laboratory Assistant and one Draftsman).		Total ...	Rs. 30,400 to Rs. 35,400		(plus allowances)
Equipment. (Spread over 3 years)	Rs. 20,000 to 25,000												
Contingencies (per year).	Rs. 5,000												
Staff :	Rs. 5,400 (plus allowances.)												
(One Senior Research Assistant in the scale of Rs. 250-25-500, One Laboratory Assistant and one Draftsman).													
Total ...	Rs. 30,400 to Rs. 35,400												
	(plus allowances)												

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 81. (ii) p. 81. The Committee recommended that Prof. Havemann be requested to take necessary action in the light of the suggestion made by the Chairman, Internal Combustion Engines Research Committee. 6. p. 81. The Committee noted.	Page 81. (ii) p. 81. The Board endorsed the recommendation of its Committee. 6. p. 81. The Board noted.

PROCEEDINGS OF INTERNAL COMBUSTION ENGINES RESEARCH COMMITTEE

Item No.	Particulars.												
	Mr. Lund asked Prof. Havemann if he had started any investigation for the development of such a combustion chamber in his laboratory. Prof. Havemann reported that they had taken up the development of a U type two stroke diesel engine and that many of the parts necessary for this unit had now been made from local workshops. In regard to the high speed heavy duty trucks, he recommended a four stroke water cooled type of engine. Mr. Lund and Mr. Gurjar opined that in the case of all development work relating to engines, it was better to concentrate on one organisation and get all the major components made there so that the industry also might be closely associated with it. The industrial organisations would be very glad to offer all co-operation. Regarding the scheme under consideration, the Chairman pointed out that since no detailed information was available on the existing combustion chamber designs and as it would be unwise to proceed with the development of a new engine without having all relevant data on hand, it would be better in the first instance to concentrate on the preparation of a literature survey, including patent literature, relating to this subject. The Committee recommended that the following grant might be made available to Prof. Havemann for this purpose for one year only : <table><tr><td>Contingencies</td><td>...</td><td>Rs. 1,000</td></tr><tr><td>Staff</td><td>...</td><td>Rs. 6,060 (including allowances).</td></tr><tr><td colspan="3">(One Senior Research Assistant on Rs. 250 p.m. One Draftsman on Rs. 100 p.m.)</td></tr><tr><td>Total</td><td></td><td>Rs. 7,060 (including allowances)</td></tr></table> 8. <i>Report of the Sub-Committee on gas turbine development.</i> (Proceedings of the I.C.E.R. Committee pertaining to this subject are given in detail under item B p. 91-93 of this agenda). 9. Interdepartmental co-operation in the Government and exchange of technical personnel among the various organisations. The Committee noted that it would be discussed again at the next meeting of the Sub-Committee. 10. Project for development of an indigenous design for an aero engine :— Prof. Havemann reported that the main aim of the scheme was (a) the design and development of 160 H. P. 6 cylinder in-line air-cooled aero engine suitable for propulsion training aircraft HT2 ; (b) the design if established to be developed further for production purposes.	Contingencies	...	Rs. 1,000	Staff	...	Rs. 6,060 (including allowances).	(One Senior Research Assistant on Rs. 250 p.m. One Draftsman on Rs. 100 p.m.)			Total		Rs. 7,060 (including allowances)
Contingencies	...	Rs. 1,000											
Staff	...	Rs. 6,060 (including allowances).											
(One Senior Research Assistant on Rs. 250 p.m. One Draftsman on Rs. 100 p.m.)													
Total		Rs. 7,060 (including allowances)											

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 83. 7. p. 81-83. The Committee noted that normally it was not the policy of the Council to make grants for literature surveys. The Committee recommended that the proposed literature survey be taken up by Mr. B.D. Puri of the Board of Engineering Research in co-operation with Dr. Havemann. It was also recommended that the D.S.I.R. be authorised to sanction a suitable grant for this purpose, if necessary, as a special case. 8. p. 83. The Committee noted that this item would be discussed in detail under Item B. p. 91-93 of this Agenda. 9. p. 83. The Committee noted.	Page 83. 7. p. 81-83. The Board noted and endorsed the recommendation of its Committee. 8. p. 83. The Board noted. 9. p. 83. The Board noted.

PROCEEDINGS OF INTERNAL COMBUSTION ENGINES RESEARCH COMMITTEE

Item No.	Particulars
	This scheme was divided into various stages as follows : (a) (i) design of the single cylinder unit in the I.C.E. Laboratory. (ii) fabrication of the proto type at the Hindustan Aircraft, Ltd. (iii) testing of proto type in the I.C.E. Laboratory. (b) (i) expanding the design for the 6 cylinder unit by the I.C.E. Laboratory. (ii) fabrication of one unit by the Hindustan Aircraft Ltd. (iii) testing of this unit in the I.C.E. Laboratory. (c) Tooling and production planning which would not be undertaken by the I.C.E. Laboratory independently but could be done in collaboration with the firms which might undertake production of such units. Of these 3 stages, the design of the single cylinder unit was now complete and component drawings were under preparation. A number of such drawings have now been passed on to the Hindustan Aircraft Ltd., where Dr. Ghatage was offering all facilities for the fabrication of the unit. Prof. Havemann pointed out that the only person associated with the scheme was Mr. R. G. Narayanamurti of the Defence Science Organisation who had now been offered the post of Assistant Professor in the Department of Power Engineering. Prof. Thacker assured that Mr. Murthi would continue to be associated with the scheme. Prof. Havemann feared that unless adequate assistance was given as had been put forth in the scheme, it might be difficult to carry this work to fruition. The Chairman informed the Committee that this scheme had been approved by the B.S.I.R. and had been recommended for financial sanction to the Ministry of Defence. The Committee considered this work of great importance and in view of the satisfactory progress, recommended that the following minimum personnel should be granted to him. Two draughtsmen on Rs. 100 p.m. each, and One pattern maker (Skilled mechanic) on Rs. 60 p.m. The Committee also recommended that the Defence Science Organisation be requested to depute another Scientific Officer to work whole time in this scheme. 11. It was noted that the replies received from the various firms manufacturing diesel engines in India regarding their problems had been forwarded to the Secretary, C.S.I.R. and that Prof. Havemann had taken note of the replies for this guidance.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 85. 10. p. 83-85. The Committee noted that research scheme of Prof. Havemann and Dr. Ghatage had already been approved by the C.S.I.R. in principle and that a suitable grant towards staff and contingencies had been offered provided the capital equipment grant was made available by the Ministry of Defence. The Committee noted that the scheme was still before the Ministry of Defence. The Committee recommended that the services of two draftsmen and one pattern maker be made available to Prof. Havemann and that the D.S.I.R. be authorised to have the scales of pay suggested scrutinised prior to sanctioning the necessary funds. It was recommended that the Ministry of Defence be requested to expedite consideration of the scheme. The Committee also endorsed the recommendation of the Research Committee that the Defence Science Organisation should be requested to depute a Scientific Officer to work whole time in the scheme. Dr. Mukherji raised the question of research on Jet Engines in India. It was recommended that the Research Committee be requested to examine this subject. 11. p. 85. The Committee noted.	Page 85. 10. p. 83-85. The Board noted and endorsed the recommendations of its Committee. 11. p. 85. The Board noted.

PROCEEDINGS OF INTERNAL COMBUSTION ENGINES RESEARCH COMMITTEE

Item No.	Particulars.
12.	Renewal of the scheme on "Development of a flash steam generator" by Mr. R. K. Mukherjee. This scheme did not relate to the development of internal combustion engines and was outside the scope of the Committee. The Chairman, however, requested Prof. Thacker to examine the scheme with his colleagues and forward the comments to him. 13. Proposal by Dr. Lal C. Verman for installation of the equipment for testing heavy duty internal combustion oils. The Chairman informed the Committee that there was a laboratory in Kanpur for testing and standardisation work relating to lubricating oils and fuels. There was also a proposal to extend the facilities available in the I.C.E. Department of the Indian Institute of Science for extensive teaching and research work in fuel and lubricating oils. The Committee agreed that this matter might be considered at a later date when sufficient finance could be made available by the Government. 14. Note from Dr. S.R. Sen Gupta on qualified engineering personnel for research :— Prof. M.S. Thacker agreed with Dr. S.R. Sen Gupta on the difficulties experienced in securing the services of first rate men on such low stipends as were offered at present. Even when a few engineers joined a scheme, it was found extremely difficult to retain them till the completion of the scheme, as many find more remunerative jobs and leave in the middle to the detriment of the schemes. The Chairman said that it was not yet possible to gather a team of five research assistants even for a period of two years for the gas turbine scheme in the grade of Rs. 160-10-330. The Committee after discussion recommended that all engineering personnel employed in engineering research schemes should be placed on Senior Assistants' grade of Rs. 250-25-500. Otherwise the Committee felt that it would not be possible to attract well qualified men for periods of 3 to 4 years. The Committee recommended that this should receive careful attention of the B.S.I.R. and a general policy decision made at an early date. 15. The Committee noted with satisfaction the response to the symposium on 'Problems relating to the development of Internal Combustion Engine Industry in India', held at Bangalore on 5th and 6th April, 1952. It was decided that the proceedings of the symposium containing the papers (about 30) together with discussions might be published. The Chairman was requested to take necessary action.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 87. 12. p. 87. The Committee noted that the comments of Prof. Thacker and the Mechanical Engineering Department of the Indian Institute of Science had since been received and a suitable renewal grant had been made to Mr. R.K. Mukherjee. 13. p. 87. The Committee noted. 14. p. 87. The Committee was in general agreement with the Research Committee that there was acute shortage of suitable engineering personnel for engineering research schemes. However, the Committee felt that it cannot be enforced as a rule that all engineering personnel be placed on Senior Research Assistant's grade. The Committee, however, recommended that the D.S.I.R. be authorised to offer higher starting pay or the Senior scale to those who were adequately qualified. 15. p. 87. The Committee endorsed the recommendation of the Research Committee.	Page 87. 12. p. 87. The Board noted. 13. p. 87. The Board noted. 14. p. 87. The Board agreed with the views of its Committee and endorsed its recommendation. 15. p. 87. The Board endorsed the recommendation of the Research Committee.

PROCEEDINGS OF GAS TURBINE SUB-COMMITTEE

Item No.	Particulars.
XXV	Subject : Proceedings of the Gas Turbine Sub-Committee. Synopsis: 1. The Board of Scientific & Industrial Research at its meeting held on March 13, 1951 approved of the constitution of a Sub-Committee on Gas Turbines to consider the nature of gas turbine development that should be undertaken in the immediate future in India. 2. A meeting of the Sub-Committee was held on 4th April 1952 at Bangalore. 3. The Chairman reported that the terms of reference of the sub-committee were circulated to (a) members of the Gas-turbine Research Sub-Committee, (b) representatives of the Fuel Research Institute, the National Physical Laboratory and the Ministry of Defence, and (c) other experts who were interested in this problem. The report of the Secretary (circulated to members of the sub-committee) had been drawn up on the basis of replies received. It was necessary to ascertain the help that was required by the main centres of research on gas turbine in order that the work might yield at the end, fruitful results. It is necessary to bring these researches to such a stage of completion as would enable building prototypes. Such prototypes would give valuable information and experience to development engineers responsible for building them. 4. A. The following recommendations were made after discussion : (i) Prof. H. A. Havemann and Dr. S. R. Sen Gupta on the basis of researches and development work which they had undertaken in their institutions, should approach the following gentlemen regarding specific assistance that they would need during the next five years for the successful completion of their projects : (a) Dr. V. M. Ghatage, Hindustan Aircraft Ltd., in regard to the casting and machining facilities that the Hindustan Aircraft Ltd. might be able to make available to these two centres of research. (b) Dr. O. J. Tietjens, Aeronautical Engineering Department, Indian Institute of Science, regarding testing facilities for (i) compressor and gas turbine blades in the high speed wind tunnel that might be expected to be ready in about a year's time and (ii) high duty turbine alloys with the aid of the creep testing machine which was expected to be set up shortly in that department. (c) Dr. M. L. Ghai, National Physical Laboratory, in regard to assistance that he could offer. (d) Dr. J. W. Whitaker, Fuel Research Institute, in regard to experimental investigations on the injection and combustion of heavy liquid fuels and designs of chambers to obtain a steady flame as required in gas turbine power plants.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 89 Item XXV p. 89. Gas Turbine Sub-Committee. 1 & 2. p. 89. The Committee noted. 3. p. 89. The Committee noted. 4 (i) p. 89. The Committee noted that as suggested by the Sub-Committee Dr. Havemann and Dr. Sen Gupta were in correspondence with the various experts regarding specific assistance that they needed from them.	Page 89. Item XXV p. 89. Gas Turbine Sub-Committee. 1 & 2. p. 89. The Board noted. 3. p. 89. The Board noted. 4 (i) p. 89. The Board noted.

PROCEEDINGS OF GAS TURBINE SUB-COMMITTEE

Item No.	Particulars.
	The Chairman explained the recommendation made by the Sub-committee. He pointed out that the main recommendations of the Sub committee were that the gas turbine research which had been undertaken in the Indian Institute of Science, and in the Bengal Engineering College, were such that an extensive co-operative scheme of research had now to be prepared so that the work that had been started in these two laboratories could be continued to lead to the development of a prototype comprising of all parts of the gas turbine unit. It was necessary to associate a representative of the Defence Ministry in any discussion relating to this problem before a final decision was arrived at. After detailed discussion the Committee recommended that another meeting of the Sub-Committee and the I.C.E.R. Committee may be convened on a suitable date in July so that the schemes received from the two main investigators and the replies received from the various National Laboratories might be collated and detailed technical and financial recommendations could be made to the Council]. C. [(i) A meeting was held on the 9th July at Calcutta in which Dr. Atma Ram, Director, C.G.C.R.I., Mr. R.B. Sathe, Assistant Director General of Ordnance Factories, Dr. S.R. Sen Gupta and his collaborators were present. Dr. Sen Gupta gave an account of the work in his scheme and drew attention to the serious drawback due to the lack of raw materials for making compressor and blade material. Dr. Sengupta submitted a list of the immediate requirements of testing equipment and material. It was felt that this minimum assistance should be made available before the project could be carried further into the production stage from the design stage. It was recommended that the Chairman may take necessary action to obtain funds for this purpose. <i>Equipment</i> : One variable stroke displacement pump, one torch igniter with pump and spark arrangement and eight swirl type atomizers. <i>Materials</i> : Nimonic sheets, 14 lbs of various pure metals and 83 lbs of ferro alloys. (ii) Mr. Sathe assured that every possible assistance would be provided by the Ordnance Factories if they were given complete details of the work they were required to undertake. He would send some engineers from his department to study the requirements of the Bengal Engineering College, who, after inspection and discussion, would be able to finalise the assistance they would be able to offer. It was agreed that this would be of considerable use in the development of a practicable design and in the proper appreciation of the production problems involved.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 93. B. p. 93. The Committee noted that the subject had already been considered under item 4 (i), (ii), (iii) and (iv) p. 89-91 of this Agenda.	Page 93. B. p. 93. The Board noted.

PROCEEDINGS OF GAS TURBINE SUB-COMMITTEE

Item No.	Particulars.
	(iii) Dr. Atma Ram said that it might be possible to give a great deal of assistance even with their present equipment. A much longer test set up would be necessary if the study of oxides at high temperature and high stresses was to be taken up in great detail. He suggested that Prof. Chatterjee might discuss with him the exact needs so that definite proposals might be put up for making available the facilities in the laboratory. It was agreed that Prof. Chatterjee would discuss details with Dr. Atma Ram who would give a report on this subject]. 5. Interdepartmental co-operation and exchange of technical personnel among the various organisations dealing with I. C. Engineering :— The discussion included the recommendation of the Committee in general. This matter would be taken up again at the next meeting of the Committee.
XXVI	Subject : Proceedings of the Coal Blending and Coking Research Sub-Committee (Chairman : Mr. S. K. Nanavati). 1. A meeting of the Coal Blending and Coking Research Sub-Committee was held on April 23, 1952. 2. ACCOUNTS :— (a) <i>Statement of revenue expenditure for January & February 1952 :</i> The expenditure under the head 'staff' for the 11 months of the year 1951-52 had gone up, mainly due to the service bonus paid to the C.B.C.R. staff since June 1951, for which no provision could be made at the time of submitting the grant application for the year under consideration. The expenditure under 'contingency' was also considerably high due to various jobs executed during the same period. There would be an overrun of Rs. 1000/1500 approximately under the head 'staff' and requisite amount would have to be reappropriated from 'contingency', should there be a surplus under the latter head. It may then be necessary to obtain the approval of the Council of Scientific and Industrial Research, New Delhi. It was decided to take necessary action when the accounts were closed for the year 1951-52. (b) <i>Renewal of grant for 1952-53.</i> Application for renewal of grant-in-aid for 1952-53 was submitted to the Secretary,

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 95. C. p. 93-95. The Committee considered that the proposal of Dr. Sen Gupta should be considered along with the other proposals as suggested under item 4 (i), (ii), (iii) and (iv) p. 89-91 of this Agenda, at a joint meeting of the I.C.E.R. Committee and the Gas Turbine Sub-Committee and a complete scheme giving all the requirements should be submitted to the Council for further consideration. It was recommended that the Chairman of the Research Committee be requested to take necessary action. General Recommendation. The Committee was of the opinion that in researches such as on gas turbine more persons capable of guiding the research were required. The Committee recommended that the D.S.I.R. be authorised to explore the availability of such talent wherever possible. 5. p. 95. The Committee noted.	Page 95. C. p. 93-95. The Board agreed with the views of its Committee and endorsed its recommendation. 5. p. 95. The Board noted.
Item XXVI p. 95. Coal Blending and Coking Research Sub-Committee. 1. p. 95. The Committee noted. 2 (a) p. 95 The Committee recommended that the D.S.I.R. be authorised to take action departmentally to sanction the reappropriation of funds as proposed.	Item XXVI p. 95. Coal Blending and Coking Research Sub-Committee. 1. p. 95. The Board noted. 2 (a) p. 95. The Board endorsed the recommendation of its Committee.

PROCEEDINGS OF COAL BLENDING AND COKING RESEARCH SUB-COMMITTEE

Item No.	Particulars
	C.S.I.R., New Delhi and the General Manager, Tisco, in October 1951. The estimated revenue expenditure for the year 1952-53 was Rs. 80,000, Rs. 63,600 being required to meet the expenditure under staff and Rs. 16,400 for contingency. The Steel Company would bear the entire expenditure towards payment of profit sharing bonus to the C.B.C.R. staff, amounting to Rs. 8,900 for the year 1952-53. The actual estimated revenue expenditure would amount to Rs. 71,122. A formal letter had been received from the Secretary, C.S.I.R. communicating the Council's sanction of a sum of Rs. 35,561 i.e. 50% of Rs. 71,122 as a block grant against revenue expenditure for the year 1952-53. 3. PROGRAMME OF WORK :— (i) Tests with West Bokaro washed coal :— In accordance with the decision of the C.B.C.R. Sub-Committee at its meeting held on 5th March 1952, further pilot oven tests were carried out using 100% West Bokaro washed coal varying the moisture content of the charging coal, from 2 to 8 percent, the grain size being 80 percent through 1/8", with the object of studying the influence of moisture content on the bulk density of the charging coal and the quality of the resultant coke. The results of pilot oven tests indicated that : (a) The bulk density was maximum when the moisture content of the charging coal was 1.7 percent and minimum at 6.83 percent. There was a reduction in the bulk density with an increase in the moisture content of the charging coal. (b) Very hard coke—according to Breslau index—was obtained from 100 percent West Bokaro washed coal, the moisture content of the charging coal being 2.0 percent. Duplicate tests confirmed the results. In all other cases the quality of coke obtained from 100 percent West Bokaro washed coal with higher moisture contents was hard—according to Breslau index. (c) In general, it appears that the quality of coke tends to become inferior with high moisture contents of the charging coal. (d) In view of the high bulk density with lower moisture contents it was desirable to operate rather with low moisture contents than with higher ones in order to increase coke ovens throughputs. The Fuel Technologist was advised to carry out a series of pilot oven tests with Tatas' 'B' schedule coal mixture varying the moisture content of the charging coal and to compare and correlate these results with those from West Bokaro washed coal under identical conditions.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 97. 2 (b) p. 95-97. The Committee noted that the C.S.I.R. had already sanctioned a grant of Rs. 35,561/- for the scheme for the year 1952-53.	Page 97. 2 (b) p. 95-97. The Board noted.

PROCEEDINGS OF COAL BLENDING AND COKING RESEARCH SUB-COMMITTEE

Item No.	Particulars.
	(ii) <i>Tests with Assam Coal :</i> Pilot oven tests were carried out using 100 percent of Assam coal sample No. 2 (sulphur content 2.965 percent) by injecting steam into the oven for production of low sulphur content coke by causing greater evolution of the sulphur during carbonisation. The results of the pilot oven tests indicated that : (a) A maximum of 42.9 percent of sulphur volatilised under normal operating conditions of the oven. (b) A maximum of 46.2 percent of sulphur could be volatilized by injecting steam into the oven during carbonisation. (c) The quality of coke obtained in all tests were very soft according to Breslau index. It was concluded that the effect of steam on desulphurisation was not appreciable, probably due to the incomplete reaction of steam with the coke mass. The above mentioned results were at variance with those obtained on a laboratory scale at the Fuel Research Institute, Dhanbad, as it was not always possible to establish the laboratory conditions on pilot plant scale and vice versa. Since the results of these investigations were of importance from the point of view of recovery of sulphur from high sulphur coals, it was decided to conduct further pilot oven tests as and when further supply of sample coal from Assam was made available to the C.B.C.R. laboratory. 4. NOTE ON COAL BLENDING FROM MR. S. C. GHOSH : The note suggested carrying out of blending tests with Poniati, Dishergarh and Sanctoria coal from Raniganj field with a view to utilise slack from these seams for production of metallurgical coke. The C.B.C.R. laboratory had already carried out blending tests with these coal samples. Further pilot oven tests had indicated that a maximum of 40 percent of these coals could be blended with Tatas' coke ovens coal mixture to yield satisfactory coke. Regarding Poniati seam coal more elaborate tests were carried out during the year 1951-52. The Ad-hoc Committee on Blending of Coals at its meeting held on 27th April 1951 had

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 99. 3. p. 97-99. The Committee noted the progress of work and recommended that the future programme suggested by the Research Committee be approved.	Page 99. 3. p. 97-99. The Board noted and endorsed the recommendation of its Committee.

PROCEEDINGS OF COAL BLENDING AND COKING RESEARCH SUB-COMMITTEE

Item No.	Particulars.
	recommended that good semi-coking coals (Poniat and Dishergarh) should not be used for blending. They should be utilised for the purpose for which they were best suited. In view of the recommendations of the Ad-hoc Committee and also that there was no immediate necessity to use these coals for carbonisation purposes it was decided not to carry out further investigations at present, on the lines suggested. 5. MISCELLANEOUS : (i) Jamodoba coal washery :— The Jamodoba coal washery was expected to come into operation some time in August this year. Mr. Ghosh was requested to prepare an estimate of cost of washing wagon load samples at the Jamodoba washery. (ii) Cyclone separator : The installation of the cyclone separator at the C.B.C.R. laboratory was in progress. Arrangements would be made for supply of wagon load sample of Kargali seam coal with higher ash content to the C.B.C.R. Sub-Committee when the plant comes into operation. The Fuel Technologist was advised to expedite the installation of the coal washing unit so that the Committee could approach the Director, Fuel Research Institute, for the sample coal. (iii) Supply of low ash sample coal from the upper sections of Kargali seam to enable carbonisation tests to be undertaken at C.B.C.R. pilot plant. The Director, Fuel Research Institute, was requested to arrange for despatch of one wagon load sample in question.
XXVII	Subject: Proceedings of the B.S.I.R. Hyderabad (Dn). Synopsis : 1. A meeting of the Board of Scientific and Industrial Research, Hyderabad was held on April 18, 1952. The State Minister for Commerce and Industries presided. 2. REPORT OF ACTION TAKEN ON THE MINUTES OF THE LAST BOARD MEETING. (i) Fibre Research Committee :— (a) Afshan paper. The Director, Central Laboratories informed that the reply received from the Indian Embassy in Washington regarding market for afshan paper, prepared in the

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 101. 4 p. 99-101. The Committee recommended that the decision of the Research Committee be approved. 5. (i) p. 101. The Committee noted. (ii) & (iii) p. 101. The Committee endorsed the recommendations of the Research Committee. Item XXVII p. 101. B.S.I.R. Hyderabad (Dn.) 1. p. 101. The Committee noted.	Page 101. 4. p. 99-101. The Board endorsed the recommendation of its Committee. 5. (i) p. 101. The Board noted. (ii) & (iii) p. 101. The Board endorsed the recommendations of the Research Committee. Item XXVII p. 101. B.S.I.R. Hyderabad (Dn.) 1. p. 101. The Board noted.

PROCEEDINGS OF B. S. I. R. HYDERABAD (Dn.)

Item No.	Particulars.
	Laboratory, was not encouraging. The Secretary, Commerce and Industries' suggestion that the samples may be sent to the Consulate General in New York, was agreed to. (ii) <i>Additional grant for Lurgi Coal Carbonisation Plant.</i> The President enquired how the shortage of nearly Rs. 2 lakhs required for Lurgi Plant would be met. The Director informed that the Fuel Committee had appointed a Sub-Committee to go into the question in detail and put up final proposals for consideration of the Board. (iii) <i>Restriction on felling of Mohwa trees.</i> Most of the trees had already been felled by the cultivators. The President's suggestion that the Forest and P.W. Departments be again requested to undertake the plantation of mohwa on large scale, was accepted. 3. REPORT OF RESEARCH WORK DONE UNDER THE COMMITTEES FROM 1-10-51 TO 31-3-1952. The report was noted with the following comments :— (i) <i>Vegetable Oil Utilisation Committee :—</i> Dehydrated castor oil:—The President suggested that pilot plant experiments on this scheme be carried out and demonstrated to the industrialists in order to induce them to take up large scale production. The Director, Central Laboratories, explained that a pilot plant with a capacity of 5 tons per 24 hours would cost about Rs. 1 lakh. The Central Laboratories may set up the plant and the working expenses and marketing of the product be undertaken by an industrialist. The Secretary, Commerce & Industries, suggested that the results of work done on this scheme be published in the form of a technical bulletin and circulated among the industrialists. It was decided that publication of the bulletin be done after patenting the process. (ii) <i>Fuel Committee :—</i> Dr. Lahiri suggested that the presence of higher boiling tar acids in the ammoniacal liquor obtained by low temperature carbonisation of coal, be investigated. Dr. Bose thought that benzoic acid might also be obtained as a product of coal carbonisation. The Director informed that experiments on investigation of the ammoniacal liquor were in progress and he would bear the suggestions in mind. (iii) <i>Fibre Research Committee :—</i> <i>Hand-made paper :—</i>The President observed that work on hand-made paper was being done for a number of years at Poona and enquired whether the same type of work was being done

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 103. 2. p. 101-103. The Committee noted.	page 103. 2. p. 101-103. The Board noted.

PROCEEDINGS OF B. S. I. R. HYDERABAD (Dn.)

Item No.	Particulars.
	in the Central Laboratories. The Director informed that the work in the Central Laboratories was being done on locally available materials for the manufacture of special type of paper.
	4. PROCEEDINGS OF THE COMMITTEES UNDER THE BOARD OF SCIENTIFIC AND INDUSTRIAL RESEARCH.
	The Board approved the continuance of following research scheme :—
	A. <i>Vegetable Oil Utilisation Committee</i> :—
	(a) (i) Investigation of custard apple seed oil.
	(a) Industrial utilisation.
	(b) Removal of toxicity.
	(c) Isolation and investigation of toxic principle.
	(ii) Preparation of dehydrated castor oil.
	(a) Preparation of bodied oil to Indian Standard Specifications.
	(b) Preparation of unbodied oil of improved colour and greater conjugation.
	(c) Utilisation of dehydrated castor oil.
	(iii) Preparation of products from castor oil (sebacic acid, perfumery chemicals and wax with high melting point).
	(iv) Activation of Hyderabad earths for bleaching purposes.
	(v) Examination of cotton seeds of Hyderabad State.
	(vi) Studies in paint driers.
	(vii) Halogenation of vegetable oils and fatty acids.
	(viii) Keeping qualities of vegetable oils.
	(ix) Investigation of oil from seeds of <i>Adonsonia digitata</i> .
	(x) Enzyme splitting of fats.
	(xi) Fractionation of fatty glycerides and acids by liquid-liquid extraction.
	(b) It was decided to postpone the following items of research programme approved previously :—
	(i) Preparation of detergents other than soaps from vegetable oils.
	(ii) Preparation of lubricants from castor oil.
	(iii) Effect of cooking of oil seed meal on the quality of oil.
	(iv) Investigation of oil from seeds of <i>Tamarindus indica</i> .
	(c) It was decided to drop the following scheme from the research programme ;—
	(i) Preparation of ammonia soaps.

Recommendations of the Committee of the Board.	Recommendations of the Board.
page 105.	Page 105.
3. p. 103-105. The Committee noted the progress of work.	3. p. 103-105. The Board noted.

PROCEEDINGS OF B.S.I.R. HYDERABAD (Dn.)

Item No.	Particulars
	B. Fuel Committee : (i) <i>Grading of Hyderabad Coal</i> :—Resolution passed by the Committee to prohibit the direct use of coal with ash content of less than 20% for steam raising: Dr. Lahiri said that the low temperature coke from Hyderabad coal would not be suitable for locomotive boilers as the draught conditions were different. It could be used as a domestic fuel if sold at the same price as coal. It was recommended that Hyderabad coal with an ash content of less than 20% be graded as chemical coal and subjected to low temperature carbonisation as much as possible and the valuable bye-products of carbonisation be recovered. (ii) It was decided to continue the following research programme :— - Low temperature carbonisation of Hyderabad coal. - Fluidized carbonisation of Hyderabad coal. - Briquetting of coal. - Washability of Hyderabad coal. - Survey of coal resources of Hyderabad State. C. Heavy Chemicals Committee :— - Utilisation of iron pyrites. - Utilisation of felspar. - Preparation of active charcoal from indigenous materials. - Utilisation of various sulphates for the preparation of sulphur compounds. - Manufacture of phosphate fertilizers with a view to conserve sulphuric acid. - Recovery of titanium from the sludge left after the preparation of aluminium sulphate from bauxite. D. Ceramic Research Committee : - Systematic study of Hyderabad clays. - Preparation of refractories from locally available raw materials. - Manufacture of clinker lime bricks. - Nature of bond in sand lime bricks. E. Fibre Research Committee : - Investigation of cotton linters and casurina pulp for the preparation of cellulose acetate rayon.

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

PROCEEDINGS OF B. S. I. R. HYDERABAD (Dn.)

P1

Item No.	Particulars.
	(ii) Preparation of hand-made paper from rags, cotton and hosiery waste and waste cotton. (iii) Utilisation of lignin : preparation of vanillin. (iv) Preparation of masonite boards using locally available resins. (v) Preparation of paper for lamp shade. <i>F. Forest Products Utilization Committee :</i> (a) Survey of medicinal plants :—The Board recommended that the Medical Department be requested to undertake the survey of medicinal plants as proposed by the Forest Products Utilization Committee in collaboration with the Central Laboratories, the Forest Department and the Botany Department, Osmania University. (b) It was agreed to continue the following research programme :— (i) Investigation of (a) custard apple seed, (b) gum of <i>Boswellia serrata</i>, (c) gum of <i>Sterculia urens</i>. (ii) (a) To study the biology of Tussar silk worm and the control of its diseases with the object of reviving the silk industry, (b) rearing Eri silk worm on castor leaf. (iii) Assay of <i>Acacia sundra</i>. <i>G. Coal Survey Scheme :</i> (i) Proposal for expansion of this scheme :—Dr. Lahiri remarked that the number of inferior staff was not sufficient to prepare the required samples and suggested that their number be increased. It was decided that the Director, Central Laboratories may make necessary adjustments in consultation with Dr. Lahiri. The proposal for the extension and expansion of the scheme for a period of three years was approved by the Board. The position will be reviewed at the end of this period. If the Industrial Trust Fund was unable to finance the expansion of the scheme it was decided that the Director may approach the C.S.I.R. for funds. (ii) The President enquired whether the Collieries Co., could be approached for funds. The Director, Central Laboratories informed that they were charging even for the supply of samples of coal. Dr. Lahiri said that samples were supplied free by the collieries for the coal survey work being done under the auspices of the C.S.I.R. Some of the companies were sending their samples to the coal survey stations for analysis and were paying fees for getting their work done.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 109. 4. A, B, C, D, E & F. p. 105-109. The Committee noted that necessary action had been taken departmentally to refer the research programme of the Hyderabad Board to the concerned Research Committees and National Laboratories under the Council in order that effective co-ordination could be established and unnecessary duplication avoided. G. p. 109. The Committee noted that a detailed scheme for a comprehensive survey of the coal resources of the Hyderabad State had been received and was under consideration of the Fuel Research Committee.	Page 109. 4. A, B, C, D, E & F. p. 105-109. The Board noted. G. p. 109. The Board noted.

PROCEEDINGS OF B. S. I. R. HYDERABAD (Dn.)

Item No.	Particulars.
	It was decided that the Singareni Collieries be requested to supply the samples required for survey work free of cost. H. <i>Industrial Ferments Committee</i> :— (a) It was decided to continue the following research programme :— (i) Pilot plant experiments on the production of yeast. (ii) Preparation of lactic acid by the fermentation of molasses on pilot plant scale. (iii) Pilot plant scale preparation of calcium levulinate. (iv) Manufacture of citric acid from molasses. (v) Investigation of fusel oil. (vi) Preparation of itaconic acid by the fermentation of sugar. (b) It was resolved that the Director, Central Laboratories, may transfer the following items to appropriate research committees :— (i) Investigation of clarification agents other than sulphur. (ii) Investigation of press mud. (c) Consideration of the Committee's recommendation that a committee be appointed to study the question of demand, production and utilisation of alcohol and molasses: It was resolved that the Director, Central Laboratories may submit a note on the subject to the Secretary, Commerce and Industries. The President promised to place the subject before the Cabinet.
XXVIII	Any other business.

Recommendations of the Committee of the Board,	Recommendations of the Board.
Page III. H. p. III. The Committee noted that the research programme of the Industrial Ferments Committee of the Hyderabad Board had been referred to the Bio-Chemical Research Committee and the National Chemical Laboratory for comments and these had been received and communicated to the Hyderabad Board for their information.	Page III H. p. III. The Board noted.

SUPPLEMENTARY ITEMS

Item No.	Particulars.
XXIX	<i>Subject :—Proposals from Dr. K.A. Hamied.</i> <i>Synopsis :</i> Dr. K.A. Hamied has requested that the following subjects may be placed before the Board and the Governing Body for consideration :— A. <i>Report of the Expert Committee on Excise Duties on Alcohol.</i> 1. Dr. K.A. Hamied says, "Under customs regulations methyl alcohol which is a deadly poison as well as other higher alcohols, such as isopropyl alcohol are classified as potable. There are also restrictions on the use of ethyl alcohol which make all progress in the chemical and pharmaceutical industry both in research and production nearly impossible. "The Government of India appointed an Expert Committee on Excise with Mr. Sathianathan as Chairman. This Committee went all over India and collected evidence on various important matters connected with this question and submitted its report more than a year ago. No action so far appears to have been taken by the Revenue Board in implementing the recommendations of the Excise Expert Committee. As this is very important for all those engaged in chemical and pharmaceutical industries as well as research, I wish therefore to move that the Board of C.S.I.R. to take immediate steps to see that recommendations of the Excise Expert Committee are implemented without delay". 2. The Government of India in a communication dated the 21st July 1952 has written to the State Governments as follows :— ".....Government of India also consider that the implementation of the recommendations of the Expert Committee as are acceptable, and are capable of being given effect to immediately, need not be held up for the publication of the Report. In order that such implementation may be facilitated, it is proposed to deal with each such recommendation, which is quite distinct from the others, as a separate issue. The Government of India will accordingly address the State Government separately on each such recommendation with which the State Government is concerned. "The All India Excise Conference 1949 was called with the express purpose of finding ways and means of rationalising, as soon as possible, the several restrictions which hinder the manufacture and distribution of medicinal and toilet preparations containing spirit. The Government of India, therefore, trust that the State Government will take all necessary measures to ensure speedy and effective implementation of the recommendations of the Committee". B. <i>Import of scientific apparatus.</i> 1. Dr. K A. Hamied says that he had drawn the attention of the Board that import

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

SUPPLEMENTARY ITEMS

Item No.	Particulars.
	restrictions on scientific apparatus required by industrial research laboratories whether run by industry or Government should be removed. This was given effect to and a number of apparatus are today free from import restriction. However, customs authorities create extraordinary difficulties at the time of clearance as the officers have no knowledge whether a particular apparatus belongs to the category of scientific apparatus or not. The lists which are provided by the Import authorities are not very comprehensive and sometimes not very clear. Dr. Hamied has given an example of how an Incubator with thermo-regulator was imported and the custom authorities refused to admit it as a scientific apparatus for laboratory use and it took several months before this was accepted. The Port Trust charges in the meantime amounted to Rs. 1,000. Hence Dr. Hamied desires that a Committee should be formed to prepare a list of scientific apparatus under various headings and forward to the Chief Controller of Imports, to be included in the list of apparatus for which no import licence should be necessary. 2. The General Licensing Instruction issued by the Ministry of Commerce and Industry with regard to this question is given below :— “It has been decided that all applications from universities, educational institutions and national laboratories for goods required for their own use for educational purposes, should be dealt with at the ports and as a rule license should be freely issued to them. “In cases where the goods applied for is one otherwise not licensed, the Deputy Chief Controller of Imports, at the port, should exercise his personal discretion in the matter and if there is any reason to suspect abuse of the concession or where either on account of the value or on account of the nature of stores involved the Deputy Chief Controller of Imports feels that the applications should be refused, he may make a reference to the Chief Controller of Imports at Headquarters.” 3. It is not clear from Dr. Hamied's letter whether the instance quoted relates to any university, educational institution or research laboratory or whether he desires that the concession should be extended to industrial organisations also. C. <i>Duty on scientific apparatus.</i> 1. Dr. Hamied says that he has written a letter to the Minister for Finance explaining the necessity of removing the duty on import of scientific apparatus or reducing the same to the very minimum. A duty of about 40% is levied at present. This makes industrial research very costly and acts as a hindrance in its advancement. Dr. Hamied has given a number of examples one of which is that a tiny motor of 1/8 h.p. used for stirring liquids is charged duty at the rate of 38%, whereas the industrial motor used for production is subject to only 10% duty.

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

SUPPLEMENTARY ITEMS

Item No.	Particulars.
	Dr. Hamied desires that a Committee be appointed to go into the details of this question and make recommendations to the Government for reducing duty on scientific apparatus as early as possible. 2 The Ministry of Education has taken up the question of extending the scope of concession to some more items of the Indian Customs Tariff, with the Ministry of Finance. D <i>Import of chemicals for research</i> 1. Dr. Hamied says, "It is very well known that unfortunately almost all chemicals required for research have to be imported from abroad. According to the present import regulations very large number of such chemicals cannot be imported without a licence. An application form has to be filled in each time and a certificate from the Director of Industries is necessary for each application. This is alright when raw materials in bulk is required but for small quantities of research chemicals and apparatus which a research worker may suddenly need, this procedure is too cumbersome and is the cause of great delay and hindrance. For example, while working on a certain problem the necessity of a chemical arises, the quantity required may be a pound or two costing a few hundreds of rupees or less. This can be obtained within a few days by cable but today the position is that this cumbersome procedure must be followed and a Director of Industries Certificate has to be obtained for even 100 grams of chemicals urgently required". Dr. Hamied therefore, suggests that the Board should recommend that some method may be laid down by which research laboratories may obtain their requirements of chemicals without recourse to this tedious process of obtaining import licences.
XXX	Subject:—A NOTE on the scope and functions of the Central Building Research Institute by the Director, Central Building Research Institute. <i>Synopsis:</i> 1. On the basis of the recommendations in the Draft Five Year Plan the Ministry of Works, Housing and Supply have proposed the establishment of National Building Organisation on the lines of the Central Roads Organisation and also a National Building Congress. It is also visualised to set up a Central Library Service for collection and dissemination of information regarding housing. 2. These proposals have been examined by the Director, Central Building Research Institute and he has submitted a note explaining that it is necessary to ensure that there is no unnecessary overlapping or duplication of efforts between the Central Building Research Institute

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 117. <i>Item XXIX p. 113-117.</i> The Committee considered that Dr. Hamied's proposals may be placed before the Governing Body of the Council.	Page 117. <i>XXIX. p. 113-117.</i> At the suggestion of the President, the Board discussed the proposals of Dr. Hamied. It was recommended that the Ministry of Commerce and Industry be requested to revise the lists of equipment exempted from customs duties in consultation with the Ministry of N. R. & S. R. and Education. The President also desired that a note on the questions raised by Dr. Hamied be sent to him.

SUPPLEMENTARY ITEMS

Item No.	Particulars.
	and the National Building Organisation. The Central Building Research Institute has also to build up and maintain a first class library providing a good library information service. It will also have to carry out surveys and keep in touch with other research institutions as also with the building industry. 3. The best way to avoid unnecessary duplication and overlapping would be to have a liaison officer of the Central Building Research Institute stationed at the State Research Institute, and the Building Research Committee of the C S I.R. should be allotted the function of co-ordination of research programmes. It is therefore suggested that — (a) the functions of the Central Building Research Institute as laid down in the Plan approved by the Governing Body in November 1951 should be kept in view while setting up any other organisation in order to avoid duplication of effort and expenditure ; (b) the Building Research Committee in consultation with the State Advisory Board attached to the State Research Institutes be assigned the function of co-ordinating the programmes of work of the Central and State Research Institutes ; (c) the Library Information Service dealing with the results of research on building materials and methods carried out in India and other parts of the world should be based on the Library and Information Section of the Central Building Research Institute.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 119 Item XXX p. 117-119. Dr. J. N. Mukherji placed before the Committee	Page 119 Item XXX p. 117-119. The Board considered the statement made by Dr. J. N. Mukherjee and endorsed the recommendations of its Committee. It was also recommended that the D.S.I.R. be authorised to place before the Planning Commission and the Ministry of Works, Housing and Supply this statement and the recommendations of the Board for their consideration.

SUPPLEMENTARY ITEMS

Item No.	Particulars.
XXXI	<i>Subject : Proceedings of the Salt Research Committee (Chairman : Dr. Mata Prasad)</i> <i>Synopsis :</i> 1. A meeting of the Salt Research Committee was held on 2nd August 1952, at Bombay. 2. The Chairman referred to the excellent services rendered by Mrs. E. McBain as a member of the Research Committee. The Committee endorsed the sentiments expressed by the Chairman in a letter to her and resolved that the letter be placed on record. 3. The D.S.I.R. announced that it had been decided to set up a Central Salt Research Laboratory at Bhavnagar. This decision had been taken because the required facilities for the establishment of the laboratory at Sambhar were not immediately available and the Government of Saurashtra which was very anxious to have a Salt Research Laboratory in the State, gave an endowment of a magnificent building, known as the 'Raj Hotel', for housing the laboratory. This laboratory was being designed on a much bigger scale than the proposed Sambhar laboratory in order to provide facilities for research work on the utilization of all the by-products obtained from the manufacture of salt. The Committee was also informed that the Saurashtra Government had also placed at the disposal of the Council 100 acres of land for the establishment of a Model Salt Farm and a Field Research Station. He also informed the Committee that in accordance with the recommendations of the Committee the Government of India had placed at the disposal of the C.S.I.R. a sum of Rs. 1.68 lakhs for the capital expenditure and Rs. 50,000 for the recurring expenditure of the proposed Central Salt Research Laboratory. The D.S.I.R. further informed the Committee that efforts were being made to establish a Salt Research Laboratory at Sambhar and other Research Stations and Model Salt Farms at Madras, Travancore and Orissa, in accordance with the recommendations of the Research Committee and of the Salt Experts Committee. 4. The Committee considered the Note and other published papers by Dr. V. Subrahmanyam, Director, Central Food Technological Research Institute, Mysore, regarding 'the effect of impurities associated with sea salt on the nutritive value of poor cereal diet'. Members were definite about the incalculable harm which had been done by this work of Subrahmanyam to efforts that were being made for improving the quality of salt manufactured at present. They were unanimous that all progressive efforts should be continued to step up the purity of common salt used for edible purposes. Shri Narielwala informed the Committee that considerable difficulty was being felt by the Government in enforcing the minimum standard of purity laid down for salt on account of such

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 121. Item XXXI p. 121. Salt Research Committee. 1. p. 121. The Committee noted. 2. p. 121. The Committee noted. 3. p. 121. The Committee noted with satisfaction the decision to establish a Central Salt Research Laboratory at Bhavnagar. It was also noted that the Planning Officer had also been appointed and he was preparing a detailed plan including long term and short term programmes of research.	Page 121. Item XXXI p. 121. Salt Research Committee. 1. p. 121. The Board noted. 2. p. 121. The Board noted. 3. p. 121. The Board noted.

UPPLEMENTARY ITEMS

Item No.	Particulars.
	indiscreet publications. In Bombay, for example, salt of 92.5% purity had been allowed to be marketed in spite of the fact that the minimum purity laid down by the Government was 94% sodium chloride. The D.S.I.R. expressed that he was totally against the kind of publicity indulged in by Dr. Subrahmanyam and as D.S.I.R. he would not, in future, allow any undue publicity to be given to any work of this nature. The Committee unanimously passed the following resolutions : (i) "The Committee thoroughly examined the papers published by Dr. Subrahmanyam, Director, C.F.T.R.I. entitled "The Effect of Impurities Associated with Sea Salt on the Nutritive value of Poor Cereal Diet," as also the Note that had been circulated on the subject and came to the following conclusions : (a) the investigations described in the papers were by no means complete or convincing; (b) the experiments have not been statistically planned; (c) even the analyses of the samples of salt employed had not been given and had not been carried out properly; (d) it was desirable that these results which contradict the established fact that edible common salt should have a certain standard of purity, should have been placed before the D.S.I.R. and the Research Committee for opinion before publication, and (e) the unusual amount of publicity indulged in this connection had aroused the suspicion that the authors had been interested in results of this type and that they had not used their discretion in verifying facts to that extent which was necessary in an investigation of this kind." (ii) "The Director, Scientific & Industrial Research is authorized to convey to the Government of India and the Ministry of Production not to take into consideration these results and to continue the policy laid down for improving the quality of salt progressively and in future all such matters should be referred to the Salt Research Committee for opinion." (iii) "A copy of these resolutions should be sent to the D.S.I.R. for communication to Dr. V. Subrahmanyam, Director, C.F.T.R.I., Mysore." The Committee was not in favour of the sanction of any grant for work of this nature and also recommended that in future Dr. Subrahmanyam should scientifically plan any investigation of this type and should take the approval of the D.S.I.R. before undertaking it. 5. (i) Shri P.N. Kathju who had been appointed as the Planning Officer, of the Central Salt Research Laboratory, placed before the Committee the blue-prints of the site and the plan of the building for the proposed Central Salt Research Laboratory at Bhavnagar and the Model Salt

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 123. 4. p. 121-123. The Committee was of the opinion that— (i) the investigation by Dr. Subrahmanyam on nutritive value of impurities in salt was only of preliminary nature. (ii) it was unfortunate that the results of such an investigation should have been pre-maturely published. (iii) the results obtained provide no valid scientific basis to slacken the present efforts to improve the quality of edible salt in the country. The Committee therefore recommended that the Government of India be requested to implement the programme already laid down for the progressive rise in the standard of purity of edible salt manufactured. The Committee also recommended that no investigation on this problem should be taken up under the auspices of the C.S.I.R. without careful consideration and recommendation of the Salt Research Committee.	Page 123. 4. p. 121-123. The Board was in general agreement with the opinion of its Committee and endorsed the recommendations.

SUPPLEMENTARY ITEMS

Item No.	Particulars.
	Farm. The Committee recommended that a thorough survey of the soil, ground level, availability of sea water in the creek (the extent and the frequency), tidal height, wind velocity and its direction, should be made before selecting the site for the Model Salt Farm. Shri Kathju informed the committee that sufficient fresh water was available for the use of both the laboratory and the Salt Farm. A sub-committee consisting of Dr. Mata Prasad, Dr. K.L. Moudgill and Shri M.B. Bhagvat was nominated for visiting Bhavnagar to make final selection of suitable sites for the Model Salt Farm and a Control Laboratory. Shri Narielwala suggested that a suitable site should be selected adjacent to the Salt Farm for setting up a pilot-plant for the recovery of the by-products. The Committee recommended that funds should be provided to meet the travelling expenses of the members of the sub-committee. (ii) The Committee recommended that 10 acres more of land should be acquired for setting up a mechanised pilot-plant for bitterns in addition to the 100 acres of land already acquired, as this was the minimum acreage for the Model Salt Farm recommended by the Salt Experts Committee. (iii) The Committee also authorised the sub-committee to look into the questions of (a) staff, and (b) the alterations and additions to the building to be used as the Central Salt Research Laboratory. It was decided that the sub-committee should meet on the next day to discuss these matters in detail. 6. Dr. Mata Prasad reviewed briefly the progress of the Model Salt Farm at Wadala, during the seasonal year 1951-52. The Committee appreciated the excellent work done at the Salt Farm and hoped that in the coming season the Model Salt Farm would be able to produce much more salt of high purity. The Committee was also of the opinion that two crystallising pans in addition to the existing four pans should be set aside for the recovery of by-products from bitterns and that the recovery of gypsum should be continued during the next season. 7. (i) The Committee reviewed the position of the salt industry after the imposition of the standard of 94% sodium chloride. Dr. Shah stated that in Bombay alone, out of the total production of 60 lakh maunds, about 22 lakh maunds were below the standard of 94% and about 7 lakh maunds below 93%. He also stated that on account of several representations made by small manufacturers in Bombay and Madras, the Government of India have reduced the standard of salt to 92.5%. The Committee regretted that the standard of 94% sodium chloride proposed for this year had been reduced to 92.5%. The Committee strongly recommended that the standard of purity should not be allowed to go down and that Government should strictly adhere to the standard of

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 125. 5. (i) p. 123-125. The Committee noted that the D.S.I.R. had taken necessary action departmentally to sanction the visit of Dr. Mata Prasad, Dr. Moudgil and Mr. Bhagvat to Bhavnagar for selecting suitable sites for the Model Salt Farm and the Control Laboratory. (ii) p. 125. The Committee endorsed the recommendation of the Research Committee. (iii) p. 125. The Committee noted that the recommendations of the Sub-Committee would be considered under item 11 p. 129-131 of this Agenda. 6. p. 125. The Committee noted and endorsed the opinion of the Research Committee.	Page 125. 5. (i) p. 123-125. The Board noted. (ii) p. 125. The Board endorsed the recommendation of the Research Committee. (iii) p. 125. The Board noted. 6. p. 125. The Board noted and endorsed the opinion of the Research Committee.

SUPPLEMENTARY ITEMS

Item No.	Particulars.
	94% sodium chloride for the seasonal year 1952-53 and then progressively raise it to 96%. (ii) Shri Narielwala observed that in order to produce good quality salt it was absolutely necessary that the Salt Works should be modified. He stated that the salt manufacturers appear to be unwilling to introduce any changes which could be enforced only if the Salt Department was empowered to withhold licences till the salt manufacturers modify their salt works. Unfortunately the Salt Department had no such powers at present. The Committee recommended that for the improvement of the salt industry, Government must empower the Salt Department with the necessary powers. (iii) The Committee discussed the question of denaturation and concluded that it would be uneconomical to denature a huge quantity of sub-standard salt, particularly because there was no industry at present in India which required this salt. The Committee suggested that this salt should not be allowed to be marketed as edible salt but could be put back into the condensers at the beginning of the next season to strengthen the brine. Dr. Shah informed the Committee that the production of salt was in excess of our requirements. This year about one lakh maunds of salt had been exported to Japan and arrangements were being made for a further export of two lakh maunds. (iv) Establishment of Model Farm at Levingipuram : Dr. Shah informed the Committee that all the plans and estimates were ready but the Salt Works could not be taken up for departmental working before the expiry of the lease in 1954, as the Government would have to pay a huge compensation for the modifications which had already been made. The Committee recommended that the Ministry of Production should find other ways and means by which this Salt Farm could be taken over from the lessee for working as a Model Salt Farm from the coming season (1952-53). (v) The Committee was also of the opinion that a Model Salt Farm should be established in Travancore at the new site (by the side of the bar-mouth of Manakudi Lake, near the sea), as recommended by the Experts Committee. Dr. Shah was requested to procure the plans of this new site and Shri Kathju agreed to obtain the necessary land from the State Government. 8. The Committee considered the quick method of assaying of common salt worked out by the National Chemical Laboratory, Poona. Dr. Mata Prasad stated that it was an indirect method and quite good for adoption by small manufacturers. The Committee agreed and suggested that it should be thoroughly verified before it was accepted. Shri Bhagvat and Shri Ramaswamy agreed to examine the efficiency of this method in their laboratories. They would inform the Chairman about the practical difficulties and the modifications if required.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 127. 7. (i) p. 125-127. The Committee endorsed the recommendation of the Research Committee. (ii) p. 127. The Committee endorsed the recommendation of the Research Committee. (iii) p. 127. The Committee endorsed the suggestion of the Research Committee. (iv) p. 127. The Committee endorsed the recommendation of the Research Committee. (v) p. 127. The Committee agreed with the opinion of the Research Committee and recommended that the Salt Commissioner be requested to take expeditious action. 8. p. 127. The Committee recommended that Mr. Bhagvat and Mr. Ramaswamy be requested to use the method developed by the National Chemical Laboratory in practice and send a report to the Chairman of the Research Committee for further necessary action.	Page 127 7. (i) p. 125-127. The Board endorsed the recommendation of the Research Committee. (ii) p. 127. The Board endorsed the recommendation of the Research Committee. (iii) p. 127. The Board endorsed the suggestion of the Research Committee. (iv) p. 127. The Board endorsed the recommendation of the Research Committee. (v) p. 127. The Board endorsed the recommendation of its Committee. 8. p. 127. The Board endorsed the recommendation of its Committee.

SUPPLEMENTARY ITEMS

Item No.	Particulars.
	9. Request of the Government of Punjab to establish a Model Salt Farm at Sultanpur : The Committee was informed that no survey of this area with regard to the brine-bearing wells, etc., had been done so far and that the soil was very porous. According to the Experts Committee's report salt industry flourished in this region upto 1900. Dr. Shah brought to the notice of the Committee that some experiments conducted by the Salt Department showed that the brine contained a very high percentage of gypsum. The Committee recommended that the Geological Survey of India should be requested to carry out a complete survey of the area and the Agricultural Department of the Government of Punjab should be asked to carry out trial bores to determine the density and availability of brine etc. It was also recommended that all preliminary data should be collected before any work can be undertaken. 10. Introductory report of the Geological Survey of India on the ground water resources of Western Rajasthan : The Committee felt that the survey carried out by the Geological Survey of India as described in its introductory report was conducted with an entirely different objective, namely, to explore the possibility of utilizing the underground waters of Western Rajasthan for irrigation purposes. The survey did not bear any indication on the possibility of utilizing these waters for the production of salt. Shri Kathju informed the Committee that this work could be done more expeditiously by the Central Salt Research Laboratory than by the Geological Survey of India. Water samples from wells could be easily collected and the analyses carried out in the laboratory. Shri Narielwala proposed that Shri P. N. Kathju be co-opted as a member of the Salt Research Committee and that he be given the services of an Assistant to carry out preliminary survey work of this area. He was also requested to submit his report to the Research Committee for consideration as soon as possible. This proposal was recommended by the Committee. 11. PROCEEDINGS OF THE SUB-COMMITTEE NOMINATED ACCORDING TO RECOMMENDATION AT ITEM 5 (i) P. 123-125 ABOVE. (i) The Sub-committee recommended the following three divisions for the Central Salt Research Laboratory. (a) Analytical Laboratory, (b) Physical Research Laboratory, and (c) Inorganic Research Laboratory. (ii) The additions and alterations which had been suggested were also approved with minor adjustments. The Sub-Committee also recommended that two additional symmetrical wings having a

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 129 9. p. 129. The Committee endorsed the recommendation of the Research Committee. 10. p. 129. The Committee recommended that the Planning Officer of the Central Salt Research Laboratory be co-opted as a member of the Salt Research Committee. It was also recommended that the D.S.I.R. be authorised to appoint a research assistant to help Mr. Kathju to carry out a survey of the sub-soil brine resources in Rajasthan.	Page 129 9. p. 129. The Board endorsed the recommendation of the Research Committee. 10. p. 129. The Board endorsed the recommendations of its Committee.

SUPPLEMENTARY ITEMS

Item No.	Particulars.
	width of 32 ft. should be constructed on either side of the main building for auxiliary, technological and semi-pilot plant experiments.
	(iii) The Sub-committee decided to meet at Bhavnagar on Monday the 11th August, 1952, to fix up suitable sites for the Model Salt Farm and a mechanised pilot plant for the recovery of the by-products.
	(iv) The Sub-committee recommended the appointment of the following staff for the Model Salt Farm and the Field Laboratory :
	One Superintendent in the grade of Senior Scientific Officer. One Dy. Superintendent in the grade of Junior Scientific Officer. One Inspector in the grade of Junior Scientific Assistant. Two foremen. One Mechanic. One Mistry. One Clerk-cum-Accountant. One Laboratory Assistant. Two Peons. Twelve Labourers.
	A contingency grant of Rs. 10,000 was also recommended.
	(v) The Sub-committee recommended the following staff for the Central Salt Research Laboratory for the present :
	One Director. One Assistant Director in charge of Inorganic & Physical Research Laboratories.
	Other Staff :—
	<i>Analytical Laboratory :—</i> One Senior Scientific Officer. One Junior Scientific Officer. Four Junior Scientific Assts.
	<i>Physical Research Laboratory :—</i> One Senior Scientific Officer. Two Junior Scientific Officers.
	<i>Inorganic Research Laboratory :—</i> One Senior Scientific Officer (Chemical Engineer). One Senior Scientific Officer (For Research). Two Junior Scientific Assts.
	<i>Library :—</i> One Librarian (Senior).
	<i>Museum :—</i> One Officer-in-charge.
	(vi) In view of the completely new nature of the scheme the sub-committee recommended that adequate funds should be made available for the establishment of this laboratory as it was on a much bigger scale than the one originally planned at Sambhar. The Committee recommended that for the Library a non-recurring grant of Rs. 25,000 should be provided.
	It was the considered view of the sub-committee that the appointment of a Director and that of a Superintendent for the Model Salt Farm should be made immediately and that the other staff be recruited according to the progress made in the execution of the plans.

Recommendations of the Committee of the Board.	Recommendations of the Board.
Page 131 II. p. 129-131. The Committee generally agreed with the proposals of the Sub-Committee. It was noted that the Central Salt Research Laboratory would consist of three divisions and a Model Salt Farm, a field laboratory and a pilot plant section. The Committee endorsed the recommendation of the Research Committee as regards the staff necessary for the present. The Committee also recommended that the post of Assistant Director (Planning) may be added to the list of staff. It was recommended that the D.S.I.R. be authorised to take necessary action for appointing the Director and the Superintendent of the Model Salt Farm as soon as possible. The Committee considered the amount of funds sanctioned by the Govt. of India, namely Rs. 1.68 lakhs for the capital and Rs. 50,000 for recurring expenditure, was insufficient for the Central Salt Research Laboratory. The Committee noted that a large sum of money was available from the proceeds of the cess levied on salt. The Committee, therefore, recommended that the D.S.I.R. be authorised to approach the Government of India for additional funds for the Salt Research Laboratory.	 Page 131 II. p. 129-131. The Board approved the proposals regarding the Central Salt Research Laboratory and endorsed the recommendations of its Committee.