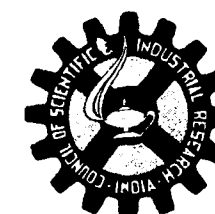


For Members only

Proceedings

OF THE 34TH MEETING OF THE

Board of Scientific & Industrial Research



IX-H 33.34
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MARCH 21, 1955

COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH, NEW DELHI

LIST OF RESEARCH COMMITTEES AND THEIR CHAIRMEN

1. Physical Research Committee	Chairman Dr. D. S. Kothari
2. Radio Research Committee	" Dr. K. S. Krishnan, F. R. S.
3. Atmospheric Research Committee	" Dr. K. R. Ramanathan
4. Committee on the Measurement of Geological Time in India	" Dr. D. N. Wadia
5. Statistics, Standards and Quality Control Committee	" Prof. P. C. Mahalanobis, F.R.S.
6. Building Research Committee	" Major Gen. H. Williams
7. Internal Combustion Engines Research Committee	" Dr. J. C. Ghosh
8. Chemical Research Committee	" Dr. K. Venkataraman
9. Pharmaceuticals and Drugs Research Committee	" Major Gen. S. S. Sokhey
10. Bio-chemical Research Committee	" Dr. V. Subrahmanyam
11. Mining Research Committee	" Mr. R. K. Ramadhyani I.C.S.
12. Fuel Research Committee	" Dr. M. S. Krishnan
13. Glass and Refractories Research Committee	" Mr. D. N. Sen
14. Salt Research Committee	" Dr. Mata Prasad
15. Essential Oils Research Committee	" Mr. A. K. Menon
16. Vegetable Oils Research Committee	" Prof. T. R. Seshadri
17. Vanaspathi Research Advisory Committee	" D. S. I. R.
18. Metals Research Committee	" Mr. J. J. Ghandy
19. Plastics Research Committee	" Dr. L. C. Verman
20. Cellulose Research Committee	" Dr. B. K. Vaidya
21. Leather Research Committee	" Mr. B. M. Das
22. Road Research Committee	" Mr. H. P. Mathrani
23. National Committee for International Geophysical Year	" Dr. K. S. Krishnan F. R. S.

COMMITTEE OF THE BOARD OF SCIENTIFIC AND INDUSTRIAL RESEARCH

A meeting of the Committee of the Board of Scientific and Industrial Research was held at 3.00 P. M. on Saturday, the 19th March, 1955 in the Conference Room of the C. S. I. R. Building, Old Mill Road, New Delhi. The following attended :

1. Lala Shri Ram (in the chair)
2. Dr. J. C. Ghosh
3. Prof. M. N. Saha
4. Dr. K. S. Krishnan
5. Dr. D. N. Wadia
6. Dr. K. A. Hamied
7. Mr. R. P. Bahadur
8. Mr. D. Padmanabhan

Secretary, CSIR
Dy. DSIR (Tech.)

The agenda for the 34th meeting of the Board of Scientific & Industrial Research was discussed and recommendations were made.

BOARD OF SCIENTIFIC & INDUSTRIAL RESEARCH

The 34th meeting of the Board of Scientific & Industrial Research was held on Monday, the 21st March, 1955 at 9.00 A. M. with Shri Jawahar Lal Nehru in the chair. The following were present :

1. Maulana Abul Kalam Azad
2. Shri K. D. Malaviya
3. Lala Shri Ram
4. Shri Kasturbhai Lalbhai
5. Dr. Jivraj N. Mehta
6. Shri J. J. Ghandy
7. Dr. J. C. Ghosh
8. Dr. K. S. Krishnan
9. Prof. M. N. Saha
10. Dr. H. J. Bhabha
11. Dr. K. A. Hamied
12. Dr. D. N. Wadia
13. Dr. D. S. Kothari
14. Prof. M. S. Thacker
15. Dr. Mata Prasad
16. Shri R. P. Bahadur
17. Shri D. Padmanabhan

Secretary, CSIR
Dy. DSIR (Tech.)

Before taking up the agenda, the President referred to the sad demise of Dr. S. S. Bhatnagar and said that he played such a vital part in the activities of the organization that it was difficult to think of the organization without him. He suggested that the Board should record its deep sense of loss and sense of appreciation of his services in the cause of science and industry in India.

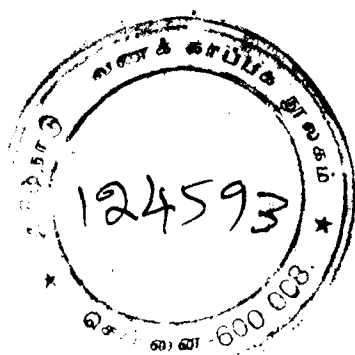
He next welcomed Shri K. D. Malaviya, Minister for Natural Resources to the meeting.

The President also referred to the proposal before the Planning Commission for the introduction of the metric system in India. A comprehensive note had been prepared in this connection, which may be circulated to the members. The Board considered that the present was the most appropriate time for the introduction of metric system into India for coinage and weights and measures. The Board was strongly in favour of its introduction.

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Proceedings of the 34th meeting of the Board of Scientific and Industrial Research
held on March 21, 1955

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IRON PRODUCTION WITHOUT COKING COAL

Item No.	Particulars
1	Confirmation of the proceedings of the 33rd meeting of the Board of Scientific and Industrial Research held on September 14, 1954.
2	Subject : Iron production without coking coal. Note : The Metals Research Committee (Chairman : Mr. J. J. Ghandhy) sponsored a research project on pilot plant investigation of production of iron in low shaft furnaces using non-coking coals. The chief feature of this project is the replacement of coking coals by non-coking coals in the iron smelting industry with a view to conserving the coking coal reserves of the country. The investigation may also result in setting up of iron and steel industry in those parts of the country where high grade iron ore is available but coking coals are not available. The project was approved by the Board and the Governing Body of the C.S.I.R. in their meeting held on March 10, 1952 and was sent to the Planning Commission for inclusion in the current Five Year Plan. The Planning Commission has agreed to this, and the sanction of Rs. 15 lakhs towards capital and Rs. 13 lakhs towards recurring expenditure on this project has been obtained from the Ministry of Finance. As regards the programme of work, as desired by the Metals Research Committee, Mr. Bucknall and Dr. Schrader had submitted a report. Since there were differences of opinion between them the Chairman had suggested that an expert from Messrs. Demag-Humboldt Niederschachtofen be invited to Jamshedpur to advise on the location of the plant, facilities required etc. Messrs. Demag-Humboldt had informed that Dr. Popp was expected to visit India sometime in January 1955 in connection with the Government Steel Plant at Rourkela and that Dr. Popp would then visit Jamshedpur to discuss the subject. At the last meeting of the Metals Research Committee held on December 3, 1954 the Director, National Metallurgical Laboratory informed the Committee that he was particularly interested in using the furnace on ferro-manganese and was trying to get some information on the oxygen required to operate the furnace. It was possible to instal an oxygen plant at a capital expenditure of Rs. 4/5 lakhs, which could supply oxygen at a cost of Rs. 50/- per ton of ferro-manganese produced whereas the cost of oxygen if supplied by the local Oxygen Company would amount to Rs. 100/- per ton. This price would be very high when making ferro-manganese. Mr. Bucknall suggested that the entire amount of Rs. 28 lakhs should go to the capital head.

2

Recommendations of the Committee of the Board	Recommendations of the Board
1 p. 1 The Committee recommended that the proceedings of the 33rd meeting of the BSIR be confirmed.	1 p. 1 The Board recommended that the proceedings of the 33rd meeting of the BSIR be confirmed.

FUEL EFFICIENCY ORGANISATION

3

Item No.	Particulars
	The Chairman suggested that Messrs Demag-Humboldt should be asked to submit a project report along with a layout drawing, so that all technical matters were finalised as early as possible. It was recommended that a Sub-Committee consisting of Mr. Bucknall and Mr. P. I. A. Narayanan of the National Metallurgical Laboratory, Mr. P. H. Kurat (Chairman), Mr. Collins and Mr. Vatchagandhy of the Tatas with powers to co-opt others, be formed to supervise the research work. The Chairman suggested that the National Metallurgical Laboratory should be largely responsible for carrying out this investigation and they should carry out the chemical analysis and provide such other assistance as may be required to operate the scheme.
3	Subject :- Fuel Efficiency Organisation Note : The Fuel Research Committee (Chairman : Dr. M.S. Krishnan) at its meeting held on December 20, 1954 considered the need for a fuel efficiency organisation in the country. In Ahmedabad and other distant areas, the industries were anxious to improve their efficiency but no organisation was available. Dr. Lahiri stated that the Coal Commissioner's organisation did include a fuel efficiency section. The members thought that the fuel efficiency organisation of the Coal Commissioner would not have the same cooperation from industries in the matter of promoting fuel efficiency as the organisation was connected with the issue of quota permits etc. They thought that Fuel Research Institute should have an independent section and possibly another section should be based at Hyderabad for promoting efficiency in the utilisation of coal. Fuel efficiency studies on combustion being more scientific should be done by F. R. I. Mobile laboratories should be set up to travel from place to place and carry out tests on the spot and guide the industrialists. If necessary, Government should consider investing the organisation with powers for carrying out their work. Such mobile laboratories have been organised in Great Britain with great success. The Research Committee recommended that a Fuel Efficiency Organisation should be set up at the Fuel Research Institute and if necessary, aid for necessary equipment may be applied for under the Colombo Plan. In order to have the support of the Coal Commissioner the Director, Fuel Research Institute was requested to discuss the matter with him also.

4

Recommendations of the Committee of the Board	Recommendations of the Board
2 p. 1-3 The Committee noted that Mr. Reuter of M/s. Demag-Humboldt had since visited Jamshedpur and had submitted a quotation with lay out drawings for setting up the pilot plant for production of iron without coking coal and that Mr. Reuter had also been requested to provide more information on certain points. The Committee recommended that the firm be requested to expedite the project report. The Committee recommended that the Research Committee be requested to examine the alternative sources of obtaining oxygen for the plant (i) from the plant's own unit, (ii) from the Indian Oxygen and Acetylene Co., and (iii) from the Vanaspati factories at as cheap a rate as possible. The Committee endorsed the recommendation of the Research Committee that a Local Sub-Committee consisting of Mr. Phiroze Kutar (Chairman) Mr. Bucknall, Mr. P. I. A. Narayanan, Mr. Collins and Mr. Vatchagandhy be formed to supervise the investigation. The Committee further recommended that the National Metallurgical Laboratory be requested to provide all the assistance required for the successful prosecution of the project.	2 p. 1-3 The Board endorsed the recommendations of the Committee and also recommended that Dr. Trivedi be nominated as a member of the Local Sub-Committee.
3 p. 3 The Committee was of the opinion that considerable amount of fuel economy could be secured in Indian industry through propaganda and education on fuel efficiency methods. The Committee recommended that the Fuel Research Committee be requested to examine the setting up of a fuel efficiency organization as part of the Coal Commissioner's office.	3 p. 3 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
4	<i>Subject : Cess on Coal</i> <i>Note :</i> The Fuel Research Committee in its meeting held on December 20, 1954 considered the subject of levy of a cess on coal for financing research. On previous occasions when such references had been made, it had been stated that any cess on coal would be levied by the Coal Board, and the Coal Board had the option of allocating such sums as it thought necessary from time to time for financing research projects, and that there was no scope for increasing the cess. The grant of Rs. 5 lakhs sanctioned by the Coal Board last year towards the establishment of a pilot washing plant at the Fuel Research Institute was subsequently turned down by the Finance Ministry as they considered that the expenditure on fuel research should be directly met by the Government and not from the funds of the Coal Board. In view of the fact that a Mining Reserach Station was now being established, any funds available for research would be diverted by the Coal Board towards this aspect of coal research. The Chairman pointed out that in South Africa they had levied such a cess. He also stated that coal was one of the most important raw materials for development of industries in India. Funds granted so far were inadequate to obtain the know-how of utilisation of coal for various processes in the shortest possible time. The Research Committee recommended that the C.S.I.R. should again approach the Government for a separate cess on coal, say, one anna per ton, for financing research not only at the Fuel Research Institute and the Mining Research Station but also in other establishments where fuel research was carried out, such as the Hyderabad Central Laboratories.
5	<i>Subject : International Geophysical Year</i> <i>Note :</i> The International Council of Scientific Unions in 1951, on the recommendation of the Mixed Commission on Ionosphere, set up a special Committee for organizing the Third International Geophysical Year 1957-58. The Special Committee met in Brussels in October 1952 and invited suggestions from member countries for preparing a detailed programme.

Recommendations of the Committee of the Board	Recommendations of the Board
4 p. 5 The Committee generally agreed with the opinion of the Fuel Research Committee that part of the proceeds from the cess on coal should be spent on research. The Committee recommended that the Ministry of Finance be requested to make a suitable allocation for this purpose.	4 p. 5 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
	The present Geophysical Year is a successor to the previous two Polar Years of 1882-83 and 1932-33. During the International Geophysical Year a network of stations throughout the world has been planned to undertake systematic observations on solar, magnetic, ionospheric, upper atmospheric and geodetic observations with the object of having as complete a picture as possible of world-wide geophysical phenomena. A National Committee with Dr. K. S. Krishnan, F.R.S. as President was constituted in India in 1953. The Committee had so far held four meetings, on June 20, 1953, April 20, 1954, December 14, 1954 and January 18, 1955 and has drawn up in collaboration with the International Body a detailed programme of work in which a number of Government scientific organisations, such as, the India Meteorological Department, research institutions and university laboratories would be participating. PROGRAMME The programme as finalized by the National Committee at its meeting held on January 18, 1955 is given below. 1. <i>World Days</i> The India Meteorological Dept. agreed to undertake the work of receiving and broadcasting ALERTS for disturbances during the special world intervals during the IGY. Such ALERT warnings will be distributed to all the participating organisations in India. 2. <i>Meteorology</i> Dr. K. R. Ramanathan is in contact with a lecturer in Kabul University about the standardisation of ozone-measuring equipment which he has in Kabul. Regarding observations at Quetta, representatives from Pakistan would be consulted by India Meteorological Dept. when they come for the World Meteorological Conference in New Delhi on the 2nd February 1955. India, will have four ozone measuring stations at Dehradun, Kodaikanal, Mt. Abu and Kashmir. The first two will be operated by the India Met. Dept. and the last two by the Physical Research Laboratory. It is expected that the present station at Ahmedabad will be shifted to Kashmir in a few months. It appears that a fifth station may also be built up. In the matter of duplicating surface ozone equipment, the India Met. Dept.'s help might be available.

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars.
	The India Met. Dept. have reported that they will have 10 radio wind stations including Port Blair, operating during the International Geophysical Year. Regarding item 2. 1. of the Rome recommendations of the CSAGI, in order to have more stations on 15° to 20° N, Pakistan and Burma Meteorological services might be contacted. Regarding item No. 2.15 of the Rome recommendations of CSAGI, measurements of the components of thermal balance (solar, terrestrial and atmospheric radiation) should be taken up by at least 3 or 4 stations in India with different climatic conditions. Such stations may be conveniently located at Poona, Delhi, Calcutta and Madras. Regarding item 2.32 of the Rome recommendations of the CSAGI, work on atmospheres will soon be undertaken at 3 different stations, namely, Delhi (India Met. Dept.) Banaras (Dr. Khastgir) and Poona (Dr. Chiplonkar). In order to plan out the work of these stations a working group has been formed with the following members : Representative of India Met. Dept. Dr. A. P. Mitra (Secretary, Radio Research Committee). Dr. K. R. Ramanathan (Chairman, Atmospheric Research Committee) (Convener) 3. <i>Geomagnetism</i> The Chairman may ascertain from the Survey of India whether it will be possible for them to maintain a full scale magnetic observatory at Dehra Dun during the Geophysical Year. The India Met. Dept. will make absolute and continuous recording of the magnetic elements at Alibag, and Kodaikanal. Additional quick-run measurements will also be made at these stations. As it is understood from Mr. Gulati that the Survey of India will not be able to run another magnetic station in S. India, the Committee requested the India Met. Dept. to run two additional stations, one of which may be at Trivandrum (south of the geomagnetic equator), and the other at some convenient location north of the geomagnetic equator. Kodaikanal was recommended as the base station for these observations. The Committee further recommended that the photographic self-recording method be adopted and that periodical checking of the measurements should be made. 4. <i>Airglow</i> The Committee emphasised the importance of the airglow measurements and

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars
	pointed out that no serious studies on airglow have been made anywhere excepting in the U. S. A. and France. The Physical Research Laboratory proposes to make airglow measurements for the green, infrared and ultraviolet regions at Mt. Abu. Professor S. K. Mitra also proposes to make airglow measurements under the auspices of the Institute of Radiophysics & Electronics, Calcutta. The Committee also suggested that Dr. Tawde of Bombay University may be requested to take up airglow observations. 5. <i>Ionosphere</i> At present, hourly vertical incidence P'f observations are being made at the following stations : Delhi, Calcutta, Ahmedabad, Bombay, Madras, Tiruchirapalli and Kodaikanal. Only three of these stations are now taking observations during all the 24 hours. During the Geophysical Year, it is hoped to arrange for round-the-clock observations at all ionospheric stations. The frequency of observations will be increased on World Days. As Tiruchirapalli and Kodaikanal are so near each other, efforts are being made to shift the station at Tiruchirapalli to Trivandrum which is a little to the south of the magnetic equator. The Institute of Radiophysics and Electronics at Calcutta and the Physical Research Laboratory at Ahmedabad have agreed to take ionospheric absorption measurements. It is possible that two more stations will join in this programme. Ionospheric wind measurements on two frequencies will be made at Ahmedabad and Calcutta. 6. <i>Solar Activity</i> The Solar Physics Observatory, Kodaikanal (2,340 m. above sea level) will participate as fully as possible in the activities of the Geophysical Year. Visual and photographic observations will be made with photoheliograph, prominence telescope, spectroheliograph (H and K lines), and spectrohelioscope. It is expected that Kodaikanal will have a coronagraph and a Lyot monochromatic filter during this year. Continuous solar noise records are being made on 100 mc/s. It is expected that by 1956, Kodaikanal will have also a 3,000 mc/s radiotelescope. There is a continuous recording magnetic observatory and normal incidence P'f automatic recording ionospheric station attached to the observatory. 7. <i>Cosmic Rays</i> Dr. Vikram Sarabhai was requested to contact the Tata Institute of Fundamental

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars										
	Research, Bombay, the Institute of Nuclear Physics, Calcutta and other institutions interested in cosmic ray work and inform the Committee about the items of work which each institution will undertake.										
8. Latitude & Longitude	The Committee noted with satisfaction that the Kodaikanal Observatory may be able to instal a Markovitch Moon Camera. The Committee also suggested that Dr. Akbar Ali of Nizamia Observatory, Hyderabad, may be requested to take part in latitude and longitude work during the International Geophysical Year.										
9. Glaciology	The Committee suggested that the Survey of India might be requested to draw up a programme of photograph mapping of selected glaciers in consultation with other organisations like the Central Water and Power Commission and the Geological Survey of India.										
10. Oceanography	The Committee suggested that the problem of the dynamics of large scale ocean currents and changes of water level should be given preference as suggested by the CSAGI. With regard to the communication of the information on the Indian programme for the geophysical year to the various institutions and individuals who might be interested, it was recommended that a note should be inserted in the C.S.I.R. News Bulletin explaining the plan of the I. G. Y. and India's part in it and inviting cooperation of scientists all over India. Further, the Committee requested Dr. K. R. Ramanathan to write an article in the Journal of Scientific & Industrial Research concerning the I. G. Y. It was decided to ask the following organisations to send lists of possible participants in the fields indicated against their names. <table> <tr> <td>India Meteorological Department</td><td>... Meteorology, Geomagnetism, Solar Activity</td></tr> <tr> <td>Radio Research Committee</td><td>... Ionosphere</td></tr> <tr> <td>Dr. K. R. Ramanathan</td><td>... Airglow</td></tr> <tr> <td>Dr. Vikram Sarabhai</td><td>... Cosmic Rays</td></tr> <tr> <td>Mr. B. L. Gulati</td><td>... Latitude & Longitude, Glaciology</td></tr> </table>	India Meteorological Department	... Meteorology, Geomagnetism, Solar Activity	Radio Research Committee	... Ionosphere	Dr. K. R. Ramanathan	... Airglow	Dr. Vikram Sarabhai	... Cosmic Rays	Mr. B. L. Gulati	... Latitude & Longitude, Glaciology
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Radio Research Committee	... Ionosphere										
Dr. K. R. Ramanathan	... Airglow										
Dr. Vikram Sarabhai	... Cosmic Rays										
Mr. B. L. Gulati	... Latitude & Longitude, Glaciology										

Recommendations of the Committee of the Board	Recommendations of the Board
5 p. 5-13 The Committee generally approved of the programme of work for the International Geophysical Year drawn up by the Indian National Committee and strongly recommended that Government of India be requested to allocate sufficient funds to the participating Government Scientific Organizations for taking active part in the programme, as the results would be of considerable value to India's scientific development.	5. p. 5-13 The Board endorsed the recommendation of its Committee.

HIGH ALTITUDE RESEARCH

Item No.	Particulars
6	Subject : High Altitude Research Note : The Atmospheric Research Committee (Chairman : Dr. K. R. Ramanathan) at its meeting held on January 17, 1955 considered this subject and made the following recommendations : Some progress has been made towards the establishment of high altitude research stations in India. - After a visit to a number of stations in Kashmir and Ladakh by Dr. Bhabha, Dr. Ramanathan, Dr. Sarabhai and Dr. Sahiar, the Atomic Energy Commission is taking steps to start a high altitude research station for cosmic rays in the Gulmarg-Khilanmarg-Apparvat region with Leh as a possible out-station for special experiments. The rate of progress will depend on how quick electric power will become available. - The School of Mountaineering established at Darjeeling by the Government of Bengal will serve as a centre for training in mountaineering and glaciology. If camp quarters capable of accomodating six to eight scientific workers could be attached to the school, it will serve the needs of students of geo-physics and high altitude biology working in the Eastern Himalayas. - A cosmic ray station of the Physical Research Laboratory, Ahmedabad has been working in Kodaikanal in the close neighbourhood of the Kodai-kanal Observatory for the last few years. The Tata Institute of Fundamental Research has recently started work at Ootacamund in the Nilgiris. These are suitable places for high altitude work in South India. - From the replies received in reply to a questionnaire that was issued by the C. S. I. R. in 1953, it was clear that many biologists interested in animal and plant ecology, bird and insect life, mycology, animal physiology etc., desired to have a high altitude research station somewhere in Garhwal or Badrinath area. Considering that a Drug Research Institute and a National Botanical Garden have been established at Lucknow, it would be desirable to locate a high altitude research station at Almora or Mussorie with living rooms and two or three working rooms for about a dozen research workers. The details of this can best be worked out by a small Committee of biologists and medical men.

Recommendations of the Committee of the Board	Recommendations of the Board

MEASUREMENT OF GEOLOGICAL TIME

Item No.	Particulars
7	(e) Leh has potential value as a research centre for high altitude physiology, both human and animal. There is a combination of permanent and migrating population there with unusual facilities for residence and work. The Special Sub-Committee for High Altitude Research may now be wound up. Subject : Measurement of geological time : results achieved. Note : The Committee on the Measurement of Geological Time in India met on December 30, 1954. The Chairman Dr. D. N. Wadia, reported the results achieved in the programme of work under the Committee. A foundation was now ready for the super-structure, the actual dating of the blank geological formations of the Himalayas and the Peninsula. By this work the Committee would give to India and the world some valid conceptions about the age of these blank formations. Work was done at the Andhra University on the radioactivity of submarine sediments and oozes in the Bay of Bengal. The Indian Institute of Science, Bangalore had given a provisional list of 8 or 9 formations based on helium-ratio determinations and the Birbal Sahni Institute of Palaeobotany, Lucknow produced a report about the microfossils discovered in the Krol formation in the Kumaon sub-Himalayas. If the host rock proved to be infra-Krols, this report will be an important contribution to Indian stratigraphy. The Chairman emphasized the importance of taking up geochronological studies with the aid of radio carbon C-14. This study began at the Andhra University last year may also be undertaken at the B. S. I. P. Lucknow and detailed work carried out on the archaeological remains from some Harappa sites. The Committee decided to publish a report on the work done in India during the last triennium 1952-54 for circulation amongst the International bodies on the lines of the report circulated by the National Research Council, Washington, U. S. A. The geological world will welcome a comprehensive report embodying some definite list of age determinations of Indian rocks. Drafts in respect of each scheme would be sent by the end of March, 1955 for being finally compiled into a Triennial Report by the Chairman.

Recommendations of the Committee of the Board	Recommendations of the Board
6 p. 15-17 The Committee generally agreed with the recommendations of the Atmospheric Research Committee on high altitude research. The Committee noted that the Department of Atomic Energy was taking necessary action to organise cosmic ray research at high altitude. The Committee recommended that the School of Mountaineering at Darjeeling be requested to provide facilities for scientific workers to undertake investigations on geophysics and high altitude biology in the Eastern Himalayas. With regard to providing such facilities in the Central and Western Himalayas, the Committee recommended that the D. S. I. R. may examine the matter further with other interested departments with a view to drawing up concrete proposals.	6 p. 15-17 The Board noted and endorsed the recommendations of its Committee.

MEASUREMENT OF GEOLOGICAL TIME

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-Item No.

Particulars

On the basis of the data collected in the Andhra University project, the following tentative sequence of main pre-Cambrian orogenic belts was suggested :—

Vindhyan 735 M. Y.

Delhi Cycle (=Cuddapah ?)

935 ± 40 M. Y.

Satpura Cycle

(Ca 1350 ± 50 M. Y.)

Eastern Ghats Cycle (=Aravallis ?)(=Upper Shillong ?)

Ca 1650 ± 50 M. Y.

Nellore Pegmatitic Cycle (?) ?

Ca 1850 M. Y.

Dharwar Cycle

Older Gneissic Complex (?)

The following table gives the age determinations by alpha-helium method at Bangalore.

<i>Name of specimen.</i>	<i>Locality.</i>	<i>Helium age in Million years.</i>
Pegmatite	Nandydurg, 66th Level	1290
Quartz Magnetite (4780)	N. Arcot Distt., Madras	1150
Vanadium bearing Magnetite (7921)	Mayurbhanj Distt. Orissa	1200
Pyroxentite (KJ/8/53)	Kanjamalai Hills, Salem	1310
Quartz Magnetite (0/7/53)	Ongole Hills	1160
Magnetite (4910)	Singhbhum (Bihar)	970
Quartz Magnetite (7974)	Salem Distt., Madras	1050
Chlorite Schist (H/3/53)	Holenarsipur	1250

These ages will be checked up with the mass spectrometer as soon as it is constructed.

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Recommendations of the Committee of the Board	Recommendations of the Board
7 p. 17-19 The Committee noted with satisfaction the results achieved in the programme of research on Measurement of Geological Time in India under the C. S. I. R. The Committee endorsed the recommendation of the Research Committee that a scientific report for the last triennium be prepared and circulated amongst scientists in India and abroad.	7 p. 17-19 The Board noted and endorsed the recommendations of the Research Committee.

RAIN AND CLOUD PHYSICS RESEARCH

Item No.	Particulars
8	Subject : Rain and Cloud Physics Research <i>Note :</i> 8.1 As decided by the Board of Scientific & Industrial Research in their meeting held on the 10th March 1953 and as approved by the Interdepartmental meeting of the Government of India held on the 3rd August 1953, a Rain and Cloud Physics Research Unit has been set up. The Advisory Committee on Rain and Cloud Physics Research (Chairman : Dr. K. R. Ramanathan) met on January 17, 1955, and formulated the following programme of research. Instruments for the research unit similar to those in use in Australia for cloud and rain studies could be obtained from the CSIRO, Australia under the Colombo Plan. The officers who would be deputed for training should be briefed to keep the subject of instrumentation particularly in mind and gain the necessary experience in building and using them. They should prepare a detailed report about them and also bring with them these instruments when they return. Dr. K. S. Krishnan agreed to write to Mr. Casey, Dr. Bowen and to Dr. White regarding the deputation of the two scientists (one of whom is to be made available by the I. A. F.) and their training. Besides the long term programme, a short term programme for the period when the junior scientists would be in Australia should be undertaken. Mr. A. K. Roy should keep himself informed of the work of Mr. Sethuraman in Madras and Mr. S. K. Ghosh and Mr. Mehta of Bihar and the other provincial governments such as Saurashtra and Madhya Pradesh. There was considerable popular interest in the subject of rain. It was therefore necessary to satisfy public curiosity. The Committee recommended that a short pamphlet or an article may be prepared by Mr. Roy explaining the exact scientific position in the subject. Mr. Roy could undertake a detailed study of the reports of similar studies in other countries. He could also undertake cloud chamber studies with different types of nuclei and cloud studies with radar. The Ministry of Defence and the India Meteorological Department might either loan their radars for this purpose or permit the staff of the unit to work with them. The Director-General, of Observatories agreed to arrange for the training of the Unit's personnel if they were attached to the Observatory at Delhi for some time. Mr. Roy could undertake immediately work with ground generators of smoke.

Recommendations of the Committee of the Board	Recommendations of the Board

RAIN AND CLOUD PHYSICS RESEARCH

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Item No.	Particulars
	Relevant statistics of rainfall and upper winds relating to areas where such seeding experiments can be started will be collected by Mr. Roy. Regarding instrumentation, the British group of research workers in the subject may also be contacted. The Committee recommended immediate appointment of 3 research assistants (their pay and scale depending on their qualifications and experience), a steno-typist-clerk and a laboratory attendant. With regard to the availability of aeroplanes for cloud physics studies, the Committee was of the opinion that cloud physics should form a part of the research activities of the Indian Air Force which require the use of aeroplanes. It was felt that there were a number of subjects in which the defence forces were interested to justify the establishment of a research operational unit in the Indian Air Force. Dr. Krishnan said that he would contact the Ministry of Defence regarding this and other immediate requirements. The Director General of Observatories informed the Committee that the co-operation of the India Meteorological Department for rain and cloud studies would be available specially in the use of their radars, in designing suitable instruments, and in procuring meteorological and other necessary data. 8.2 Financial requirements for 1955-56. <i>Recurring :</i> <i>Staff :</i> Rs. 43,766 [One Officer-in-Charge; one S. S. O. (Air Force Meteorologist), one J. S. O. (Radio Physicist); 3 Senior Scientific Assistants; one Steno-typist; two Lab. Attendants] <i>Contingencies :</i> Rs. 10,500 [Travelling allowances; honoraria for the maintenance of rain-gauges; miscellaneous (chemicals, hydrogen, balloons etc.); deputation of scientists]

Recommendations of the Committee of the Board

Recommendations of the Board

Item No.	Particulars
	Capital : (Instruments in India and from Australia) ... Rs. 15,000 Total ... Rs. 69,266
8.3	<i>Second Five Year Plan</i> As the radar technique of measurements in clouds is an important part of the programme of work at the Rain & Cloud Physics Research Unit, it is proposed to make provision for the purchase of one AN/CPS-9 radar in the Second Five Year Plan. Centimetre radars are used in many countries for the study of microphysics of clouds. While 10 cm. radars are used in detection of precipitation at long range, 3 cm. radars are used in the measurement of cloud parameters at shorter ranges not exceeding 50 miles. Though the use of radars operating on lower powers had been suggested and used for measurements of liquid water content, drop-size distribution, intensity of turbulence, speed of updraught in clouds, many of the workers are of the opinion that a high power 3.2 cm. radar with the highest quality recording arrangements would be more suitable for measurements in clouds. The loss of sensitivity on account of lower wavelength is to be compensated by increased power output. A 3 cm. radar should have 200-250 kw. peak transmitted output. A 3 cm. radar with such high output power as AN/CPS-9, is manufactured by Raytheon Mfg. Co., Waltham, Mass, U. S. A. The rough cost of the complete equipment is Rs. 11,00,000. The great advantage in the use of radars lies in the fact that the running cost is very small, the reliability of measurement is greater and lastly no disturbance is caused to a cloud when a radar beam is directed into it.
9	Subject : Biological Research : Note : 9.1 With a view to promoting fundamental research in biological sciences a Joint Sub-Committee was set up by the Advisory Committee for Co-ordinating Scientific

Recommendations of the Committee of the Board	Recommendations of the Board								
8 p. 21-25 The Committee recommended that the programme of research on rain and cloud physics drawn up by the Advisory Committee be approved. The Committee noted with satisfaction that the Indian Air Force and the India Meteorological Department were co-operating in this programme. The Committee recommended the following financial provision for the project during 1955-56. <table> <tr> <td>Staff</td><td>Rs. 43,766</td></tr> <tr> <td>Contingencies</td><td>Rs. 10,500</td></tr> <tr> <td>Capital</td><td>Rs. 15,000</td></tr> <tr> <td>Total :</td><td>Rs. 69,266</td></tr> </table> The Committee also strongly recommended the provision of a 3 cm. radar for this project in the Second Five Year Plan.	Staff	Rs. 43,766	Contingencies	Rs. 10,500	Capital	Rs. 15,000	Total :	Rs. 69,266	8 p. 21-25 The Board noted and endorsed the recommendations of its Committee.
Staff	Rs. 43,766								
Contingencies	Rs. 10,500								
Capital	Rs. 15,000								
Total :	Rs. 69,266								

BIOLOGICAL RESEARCH

Item No.	Particulars						
	Work of the Ministry of N. R. & S. R. and the Biological Board of the National Institute of Sciences of India. The recommendations of the Sub-Committee were considered by the Advisory Committee for Co-ordinating Scientific Work at its meeting held on 29th November, 1954. Dr. S. S. Bhatnagar advised the Committee that at the present stage of biological research in the country, the best method of making progress would be through the establishment of wings for biological research in recognised institutions. The Advisory Committee while accepting the recommendations of the Sub-Committee recommended <i>inter alia</i> that the C. S. I. R. should provide funds for the following <i>ad hoc</i> schemes of research : 9.1.1 Basic studies in animal genetics by the Director, Indian Cancer Research Centre, Bombay. [Studies in animal genetics are in progress at the Indian Cancer Research Institute. It is now intended to enlarge the scope on the following lines : (a) studies in human genetics with reference to blood groups and hereditary diseases ; (b) genetical and cytological studies in small rodents with reference to abnormal growth, development and gene action. Grant asked for : <table> <tr> <td>Non-recurring (for building, equipment etc.)</td><td>... Rs. 1,81,000</td></tr> <tr> <td>Recurring : (Staff and contingencies)</td><td>... Rs. 45,000</td></tr> <tr> <td>Total</td><td>... <u>2,26,000</u>]</td></tr> </table> 9.1.2 Research on cytogenetics and physiogeny of mango and banana by the Maharashtra Association for the Cultivation of Science, Poona. [The object of the scheme is to make extensive collections of cultivated and wild varieties of mango and banana from areas not previously explored and arrive at general conclusions regarding the inter-relationship of the cultivated varieties and trace their origins by a study of all relevant characters. The work will be in continuation of the work done in the I. C. A. R. scheme during 1942-50.	Non-recurring (for building, equipment etc.)	... Rs. 1,81,000	Recurring : (Staff and contingencies)	... Rs. 45,000	Total	... <u>2,26,000</u>]
Non-recurring (for building, equipment etc.)	... Rs. 1,81,000						
Recurring : (Staff and contingencies)	... Rs. 45,000						
Total	... <u>2,26,000</u>]						

Recommendations of the Committee of the Board	Recommendations of the Board
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BIOLOGICAL RESEARCH

Item No.	Particulars
	Grants asked for:
	Non-Recurring : ... Rs. 6,100 (Binocular and research microscopes)
	Recurring ... Rs. 15,500
	Total ... <u>Rs. 21,600</u>]
	9.1.3 Induced mutagenesis in plants at the Bose Research Institute, Calcutta.
	[The investigation will be with special reference to paddy (<i>Oryza sativa</i> Linn). The object of the scheme is to collect as many of the stable types in the above crop plant and induce mutations in them by the action of X-rays, neutrons, ultra-violet light, ultrasonic vibrations, radio active isotopes like P ³² and C ¹⁴ and mustard gas (nitrogen and sulphur mustards).
	Grants asked for :
	Non-recurring ... Rs. 50,000
	Recurring ... Rs. 25,000
	Total ... <u>Rs. 75,000</u>]
	9.1.4 Cytogenetical studies on animal chromosomes under normal conditions and after various kinds of physical and chemical treatments at Calcutta University.
	[The following lines of research are envisaged under the scheme : (a) structure and behaviour of the chromosomes of Indian animals and the study of the spontaneous chromosomal mutations in the natural population, its bearing on evolution ; (b) genetical work on <i>Dysdercus</i> and <i>Drosophila</i> or other animals including the study of the effects of ionizing radiations on them ; (iii) studies on the effect of physical and chemical agents on animal chromosomes with a view to further understanding of the nature and causes of structural changes in relation to the above agents.
	Grants asked for :
	Non-recurring ... Rs. 1,27,800
	Recurring ... Rs. 33,500
	Total ... <u>Rs. 1,61,300</u>]

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars												
9.2.0	Besides the above proposals, the Council has also been receiving now and then schemes pertaining to other fields of biology, three of which are given below :												
9.2.1	Hilsa fishery in U. P. waters by Dr. D. R. Bhattacharya, Honorary Professor of Zoology, C. P. M. Degree College, Allahabad University. [It is proposed to investigate the biology (feeding, breeding habits, maturity, migration, etc.) of Hilsa fish in U. P. waters. Grant asked for : <table> <tr> <td>Equipment</td><td>... Rs. 2,000</td></tr> <tr> <td>Contingencies</td><td>... Rs. 1,200</td></tr> <tr> <td>Staff :</td><td>... Rs. 4,070 (including allowances)</td></tr> <tr> <td>(1 J. R. A. on Rs. 160-10-330</td><td></td></tr> <tr> <td>1 Field Assistant on Rs. 60/- p. m.)</td><td></td></tr> <tr> <td>Total</td><td>Rs. 7,270</td></tr> </table> —do—]	Equipment	... Rs. 2,000	Contingencies	... Rs. 1,200	Staff :	... Rs. 4,070 (including allowances)	(1 J. R. A. on Rs. 160-10-330		1 Field Assistant on Rs. 60/- p. m.)		Total	Rs. 7,270
Equipment	... Rs. 2,000												
Contingencies	... Rs. 1,200												
Staff :	... Rs. 4,070 (including allowances)												
(1 J. R. A. on Rs. 160-10-330													
1 Field Assistant on Rs. 60/- p. m.)													
Total	Rs. 7,270												
9.2.2	Morphology, breeding habits and seasonal variations in the gonads of certain Teleostei by Dr. S. K. Dutta, Reader in Zoology, Allahabad University. [The object of the scheme is to determine the maturity and the breeding season of Teleostei fishes. The results may determine the fecundity of this species of fish and will be of aid to pisciculture in the country. Grant asked for : <table> <tr> <td>Contingencies</td><td>... Rs. 1,000</td></tr> <tr> <td>Staff :</td><td>... Rs. 4,070 (including allowances)</td></tr> <tr> <td>(1 J. R. A. on Rs. 160-10-330</td><td></td></tr> <tr> <td>1 Field Assistant on Rs. 60/- p. m.)</td><td></td></tr> <tr> <td>Total</td><td>Rs. 5,070</td></tr> </table> —do—]	Contingencies	... Rs. 1,000	Staff :	... Rs. 4,070 (including allowances)	(1 J. R. A. on Rs. 160-10-330		1 Field Assistant on Rs. 60/- p. m.)		Total	Rs. 5,070		
Contingencies	... Rs. 1,000												
Staff :	... Rs. 4,070 (including allowances)												
(1 J. R. A. on Rs. 160-10-330													
1 Field Assistant on Rs. 60/- p. m.)													
Total	Rs. 5,070												
9.2.3	Cytotaxonomical investigations of the flora of Rajasthan desert by Mr. Shanti Sarup, Professor of Botany, Jaswant College, Jodhpur. [Mr. Shanti Sarup has proposed to carry out cytotaxonomical investigations on a few species of plants growing in Jodhpur and its neighbourhood for determining their true character.												

Recommendations of the Committee of the Board	Recommendations of the Board

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PHYSICAL RESEARCH AND DEVELOPMENT

Item No.	Particulars								
	Grant asked for: <table> <tr> <td>Equipment</td><td>... Rs. 4,000</td></tr> <tr> <td>Contingencies</td><td>... Rs. 2,500</td></tr> <tr> <td>Staff : (1 SRA, 1 JRA, 1 Lab. Asstt., 1 Peon)</td><td>... Rs. 6,500</td></tr> <tr> <td>Total :</td><td>Rs. 13,000]</td></tr> </table> 9.3 Certain aspects of biological research which have a bearing on agriculture and public health come under the purview of I. C. A. R. and I. C. M. R. and proposals in respect of these are referred to these bodies. Government maintained Agricultural Research Stations and Fisheries Research Stations are also carrying out researches on biological subjects. There are, however, a number of topics which do not come within the ambit of these organizations and are not of immediate value to them, especially fundamental research on biology, and they do not provide grants to biologists outside their organisations in the universities. Biological scientists working in university laboratories and research institutions are approaching the C. S. I. R. for financial assistance. 9.4 The matter is placed before the B. S. I. R. for laying down a policy that should be followed by the Council for fostering biological research.	Equipment	... Rs. 4,000	Contingencies	... Rs. 2,500	Staff : (1 SRA, 1 JRA, 1 Lab. Asstt., 1 Peon)	... Rs. 6,500	Total :	Rs. 13,000]
Equipment	... Rs. 4,000								
Contingencies	... Rs. 2,500								
Staff : (1 SRA, 1 JRA, 1 Lab. Asstt., 1 Peon)	... Rs. 6,500								
Total :	Rs. 13,000]								
10	Subject : Physical Research and Development Note : 10.1.0 Instrumentation and Instrumental Research in Defence Organisation The Physical Research Committee at its meeting held on February 3, 1955 considered the letter received from Prof. M. W. Chiplonkar, Head of the Physics Department, University of Poona, on 'Instrumentation and Instrumental Research in Defence Organisation.' 10.1.1 (1) Instrumentation : Dr. Chiplonkar has proposed that the University Department of Physics should be recognised as a centre for research in instrumentation and subsidized by giving recurring grants for developing local talents.								

Recommendations of the Committee of the Board	Recommendations of the Board
9 p. 25-33 The Committee was of the opinion that while in the field of physical sciences considerable development had taken place in the country, biological sciences had generally lagged behind. Recent developments in biological sciences have established the importance of organised biological research in industrial and national development. The Committee recommended that research on such biological subjects as had not so far received sufficient attention in India should be developed. The Committee recommended the appointment of an Expert Committee of biologists consisting of : - Dr. P. Maheshwari (Chairman), Professor of Botany, Delhi University. - Dr. B. R. Seshachar, Prof. of Zoology, Mysore University. - Dr. H. K. Mukherjee, University College of Science, Calcutta. - A representative of I. C. A. R. - A representative of I. C. M. R. (i) to consider the present state of development of biological sciences in India, (ii) to recommend the subjects and the extent to which biological research should be supported by the C. S. I. R. and (iii) to consider the specific schemes which had been submitted to the Council and to make recommendations.	9 p. 25-33 The Board endorsed the recommendations of the Committee and also recommended that a representative of the National Institute of Sciences be coopted on the Expert Committee.

Item No.	Particulars
	10.1.2 Instrumental Research in Defence Organisation : Instruments and scientific aids designed primarily for defence purposes of a country are mostly covered and protected by secret patents. In our country the Defence Scientific Organisation is possibly restricted to only a few branches of instrumentation. If such instruments are designed in the universities due credit and proper additional facilities should be given to them by providing direct contact and and co-operation with the defence research organisation. To this end special schemes for developing such instruments and the secret patents be invited from the universities. The Committee felt that the suggestions made in the letter were very general, but if Prof. Chiplonkar had any concrete proposals they would consider them in relation to the Second Five Year Plan. 10.2 Physical Research and the Second Five Year Plan In view of the importance of the subject, the Committee appointed a Sub-Committee consisting of Dr. K. R. Dixit (Convener), Dr. R. S. Krishnan, Dr. B. D. Nag Chaudhuri and Prof. S. V. Chandrasekhar Aiyar, to go into the different aspects of the matter and prepare a draft report to the C. S. I. R. by the end of March, 1955. Subject : Atmospheric Research Note : 11.0 The Atmospheric Research Committee considered the following subjects in its meeting held on January 17, 1955 with Dr. K. R. Ramanathan in the Chair. 11.1 International Geophysical Year : Programme with regard to physics of the atmosphere The Chairman stated that in drawing up the Indian national programme, the long-term requirements of the country had been kept in mind and could therefore be appropriately included in the Five Year Plan of development. The Committee recommended that preparations should be made to start on the programme of work for the International Geophysical Year well in advance so that the necessary equipment could be obtained and personnel trained for the work.

Recommendations of the Committee of the Board	Recommendations of the Board
10. 1. 1 & 10. 1. 2 p. 33-35 The Committee recommended that Prof. Chiplonkar be requested to submit concrete proposals, if any. 10. 2 p. 35 The Committee recommended the appointment of a Sub-Committee as proposed by the Physical Research Committee for drawing up a research programme in physics for the Second Five Year Plan with special reference to instrumentation. 11. 0 p. 35 The Committee noted. 11. 1 p. 35 The Committee endorsed the recommendation of the Research Committee that the programme of work for the International Geophysical Year should be started as soon as possible so that the necessary equipment could be obtained and the personnel trained well in advance.	10. 1. 1 & 10. 1. 2 p. 33-35 The Board endorsed the recommendation of its Committee. 10. 2 p. 35 The Board endorsed the recommendation of its Committee. 11. 0 p. 35 The Board noted. 11. 1 p. 35 The Board endorsed the recommendation of The Research Committee.

Item No.	Particulars
	11.2.0 Second Five Year Plan 11.2.1 The Committee considered that as far as physics of the atmosphere was concerned, it would be desirable to concentrate on a few main lines of work. A unit for research on rain and cloud physics had already been set up; and a programme of work in connection with the International Geophysical Year has also been drawn up. To get these well done will require the full attention of the Committee. 11.2.2 The Committee was of the opinion that more attention could usefully be given in a few Indian universities to the study and teaching of modern physical hydro and aero dynamics. It was recommended that the Inter-University Board should be requested to take up this matter. 11.2.3 The Committee was also of the opinion that systematic work on dynamical climatology in the India Meteorological Department would be of great value for the practice of medium range forecasting. 11.2.4 The India Meteorological Department was also requested to take up the question of publishing in a convenient form the upper air data gathered by them with great effort and expenditure so that it could be available to research workers all over the country. 11.3 Formation of Meteorological Society The Committee considered the report submitted by the working group of three members appointed earlier and also the draft constitution. The Committee was of the opinion that the formation of a society would help in the further cultivation and utilisation of the science of meteorology and cognate sciences. The Committee recommended that a meeting should be held in Delhi in October 1955 at the time of the meeting of the National Institute of Sciences and all those who had shown active interest in this project should be invited. The Committee authorised the Chairman and the Director General of Observatories to call such a meeting.
12	Subject : Radio Research and Development Note : 12.0 The Radio Research Committee (Chairman : Dr. K. S. Krishnan F.R.S.) at its meeting held on January, 19, 1955 considered the following subjects :

Recommendations of the Committee of the Board	Recommendations of the Board
11. 2. 1 & 11. 2. 2 p. 37 The Committee recommended that the Inter-University Board and the University Grants Commission be requested to consider the question of instituting courses of study in modern physical hydro and aero dynamics in some of the Indian Universities.	11. 2. 1 & 11. 2. 2 p. 37 The Board endorsed the recommendation of its Committee.
11. 2. 3 & 11. 2. 4 p. 37 The Committee recommended that India Meteorological Department be requested (i) to take up systematic work on dynamical climatology, and (ii) to publish the upper air data collected by them for the benefit of research workers in the country.	11. 2. 3 & 11. 2. 4 p. 37 The Board endorsed the recommendation of its Committee.
11. 3 p. 37 The Committee welcomed the proposal to form a meteorological society in India and endorsed the recommendation of the Research Committee for convening a preliminary meeting for the purpose.	11. 3 p. 37 The Board endorsed the recommendation of the Research Committee.
12. 0 p. 37 The Committee noted.	12. 0 p. 37 The Board noted.

Item No.	Particulars
12.1	<i>Planned Programme Sub-Committee</i> [The Sub-Committee considered the two draft programmes of planned radio research in India, one prepared by Prof. K. Sreenivasan and the other by Dr. A. P. Mitra, Secretary, Radio Research Committee. The Sub-Committee felt that a planned programme for radio research is of considerable importance for national development and as such the detailed planning would require considerable time and effort. The Sub-Committee was of the opinion that further planning may be done on the basis of the draft programmes of Prof. Sreenivasan and Dr. Mitra and keeping in view the recommendations of the CCIR and the needs of the Indian Industry. The Sub-Committee therefore suggested that the programme should be planned on the following lines : (i) Investigations of practical nature should be given preference (e. g. problems recommended by the C.C.I.R.) (ii) Investigations with possible applications to industry should be preferred. These will include development of raw materials for radio components manufacture of radio components, and instrumentation of various types. (iii) Problems recommended by the U. R. S. I. and the C.S.A.G.I. are also to be undertaken, most of which are included in the two draft programmes. The Sub-Committee also stressed the importance of finding out the extent of facilities available in the different institutions in India. It was suggested that the Secretary, Radio Research Committee, may be asked to visit different institutions in India for this purpose. The members of the Radio Research Committee may also be requested to contact the different radio research organisations which they may visit during their professional tours to find out the problems which may be usefully undertaken by these institutions.] The Sub-Committee requested Mr. T. V. Ramamurthi, Dr. M. B. Sarwate and Mr. B. V. Baliga to prepare a detailed planned programme on the basis of the above recommendations. The Radio Research Committee approved the recommendations of its Sub-Committee and recommended that the Sub-Committee should continue its work.

Recommendations of the Committee of the Board	Recommendations of the Board
12.1 p. 39 The Committee endorsed the recommendations of the Radio Research Committee regarding preparation of a planned programme of radio research and further recommended that the Sub-Committee be requested to expedite its final proposals.	12.1 p. 39 The Board endorsed the recommendation of the Research Committee.

RADIO RESEARCH AND DEVELOPMENT

Item No.	Particulars
	12.2 Raw Materials Sub-Committee [The Sub-Committee discussed the development of raw materials for radio components since the last meeting, and noted that while substantial work has been done in the National Physical Laboratory of India on the manufacture of radio components using indigenous materials, little progress has been made on the development of raw materials. The Sub-Committee felt that in order to have a more rapid development of raw materials, a working group should be set up under the Sub-Committee. The terms of reference for the working group will be : (i) Tentative specifications to be compiled for raw materials used in radio components as far as is practicable ; (ii) Survey of industries that are likely to be interested in manufacture of raw materials that will be useful to the radio component industry ; (iii) Suggest programme of investigations in the various laboratories and institutions which may help in utilisation of substitute materials for manufacture of radio components ; (iv) Survey and review of materials in the light of previous recommendations and keeping in view modern progress in component manufacture. The working group should consist of : (i) Representative from the National Physical Laboratory of India (Mr. T. V. Ramamurthi) Convener. (ii) Representative from the Ministry of Commerce and Industry associated with the radio industry ; (iii) Local Representative of the Radio Manufacturers Association of India. The working group may co-opt any additional members it may need in future. The Sub-Committee was further of the opinion that a full time Scientific Assistant be appointed under the Radio Research Committee to help the working group in its work. The Sub-Committee was also of the opinion that it should meet at least twice a year and the meetings should preferably be independent of the meetings of the Radio Research Committee.] The Radio Research Committee endorsed the recommendations of its Sub-Committee. It, however, felt that as the amount of work involved is expected to be

Recommendations of the Committee of the Board	Recommendations of the Board

RADIO RESEARCH AND DEVELOPMENT

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	quite large, a full-time Scientific Assistant as well as a Steno-typist Clerk should be placed at the disposal of the Committee and the Working Party on Raw Materials for a year.
12.3	<i>Sub-Committee on International Radio Consultative Committee (C.C.I.R.)</i> The Committee considered the report of the Sub-Committee on C. C. I. R. The Committee adopted the report and referred it to the Planned Programme Sub-Committee for including it in appropriate places in the programme. Details of the recommendations of the various study groups of the C.C.I.R. are not enumerated as these will be incorporated in the report of the Planned Programme Sub-Committee.
12.4	<i>Correlation and publication of ionospheric data</i> The Secretary, Radio Research Committee reported that the work on correlation and publication of ionospheric data has been initiated. The Ionospheric Bulletin is expected to be issued in March, 1955. The All-India Radio, the Institute of Radiophysics and Electronics, Calcutta, and the Physical Research Laboratory, Ahmedabad, have agreed to send their ionospheric data for inclusion in the Bulletin. The Overseas Communication Service have been approached for supply of data on actual propagation conditions for different overseas circuits for inclusion in the Bulletin. They have agreed to supply these in the form of shadowgraphs. Regarding the ionospheric observations at Kodaikanal the Secretary reported that the India Meteorological Department has not yet agreed to supply their ionospheric data. The Committee suggested that the question of availability of the ionospheric data (and also of the solar and geomagnetic data) of Kodaikanal for inclusion in the Bulletin of the Committee should be taken up by the Chairman with the authorities concerned. The Committee also pointed out the importance of an ionospheric station at Trivandrum which will serve as a station doublet of Kodaikanal. The Indian National initiative of such a station and the All-India Radio has been requested to take up this matter. The Committee also recommended that attempts should be made to make round-the-clock observations at the existing ionospheric stations.

Recommendations of the Committee of the Board	Recommendations of the Board
12. 2 p. 41-43 The Committee recommended the formation of a working group consisting of representatives of the National Physical Laboratory, the Ministry of Commerce & Industry, All India Radio & the Radio Manufacturers Association of India to deal with development of raw materials for the manufacture of radio components in India, with the terms of reference suggested by the Radio Research Committee. It was also recommended that the services of a temporary scientific assistant and a typist be made available to the working group for one year.	12. 2 p. 41-43 The Board endorsed the recommendations of its Committee.
12. 3 p. 43 The Committee noted.	12. 3 p. 43 The Board noted.
12. 4 p. 43 The Committee noted with satisfaction the arrangements made for compilation and publication of ionospheric data in India. The Committee recommended that (i) the Ministry of Communications be requested to make available ionospheric and the related solar and geomagnetic data of the Kodaikanal Observatory for correlation and publication along with the ionospheric data from other centres in India, as such a unified publication would be not only of scientific value but of great practical utility, (ii) the All India Radio be requested to set up an Ionospheric Station at Trivandrum and, (iii) efforts should be made to make round the clock observations at the existing centres.	12. 4 p. 43 The Board noted and endorsed the recommendations of its Committee.

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12.5	<i>Practical training in radar and microwaves</i> The Committee considered the question of continuing the practical training course on radar and microwaves in Defence Establishments to civilian scientists in universities, research institutes etc. The Committee recommended the continuance of this course. The Committee, however, suggested that in selecting the trainees, preference should be given to those candidates who are likely to apply their experience so gained to their future work.
12.6	<i>Atmospherics</i> The Committee took up the question of co-ordinating the different work on atmospherics at the suggestion of Dr. K. R. Ramanathan. In the near future, India may have three stations investigating atmospherics, one of which is operated by the India Meteorological Department, the second is now being operated by Dr. S. R. Khastgir under the Committee and the third scheme under Dr. M. W. Chiplonkar has been approved by the Committee. It is desirable to co-ordinate the activities of these three stations. Since there are two aspects of such investigations—meteorological and ionospheric—both these aspects have to be considered in this connection. The Committee suggested that a working party be formed consisting of Dr. K. R. Ramanathan, Chairman, Atmospheric Research Committee, one representative of the India Meteorological Department and Dr. A. P. Mitra. This working party will draw up a co-ordinated programme on the study of atmospherics.
12.7	<i>International Geophysical Year</i> The Committee considered the Indian National Committee's programme for the ionosphere for the International Geophysical Year for 1957-58. The Committee suggested that a working party may be set up in the next meeting to draw up a detailed plan for co-ordinated work in these lines.
12.8	<i>Meetings of the Committee</i> The Committee felt that it was desirable to have a technical session along with the administrative sessions in connection with the Committee meetings. The subjects of discussion during the technical sessions will be decided by the Chairman who will invite workers in the relevant fields to present papers for that session. The Committee further felt that, for the benefit of the technical sessions, it was desirable to change the venue of the meetings frequently. For any particular session, the venue should be the place where active research is going on in the field to be discussed in the technical session.

Recommendations of the Committee of the Board	Recommendations of the Board
12.5 p. 45 The Committee recommended that the Ministry of Defence be requested to provide practical training facilities in radar and microwaves to civilian scientists during the year 1955-56. It was further recommended that the DSIR be authorised to incur the necessary expenditure in this connection as usual.	12.5 p. 45 The Board endorsed the recommendations of its Committee.
12.6 p. 45 The Committee recommended the formation of a working party consisting of Dr. K. R. Ramanathan, a representative of the India Meteorological Department and Dr. A. P. Mitra to draw up a coordinated programme on the study of atmospherics.	12.6 p. 45 The Board endorsed the recommendation of its Committee.
12.7 p. 45 The Committee noted.	12.7 p. 45 The Board noted.
12.8 p. 45 The Committee agreed with the opinion of the Radio Research Committee that technical sessions should be held along with meetings of the Research Committees, in which original papers could be presented and discussed. It was recommended that specific proposals should however be submitted by the Research Committees to the D. S. I. R. who may be authorised to examine the proposals and take appropriate departmental action.	12.8 p. 45 The Board agreed with the opinion of the Research Committee and endorsed the recommendation of its Committee.

METALLURGICAL RESEARCH

Item No.	Particulars
13	Subject : Metallurgical Research Note : 13.0 At a meeting of the Metals Research Committee (Chairman : Shri J. J. Ghandy) held on December 3, 1954 the following subjects were considered. 13.1 <i>Planning of research</i> The Chairman drew the attention of the members to D. S. I. R's note. He suggested that the Metals Research Committee should take stock of the metallurgical research that was being done in the country and plan the future programme of work. Members must take interest in the research programme sponsored by the Committee and also watch the progress. Although the National Metallurgical Laboratory was making useful contribution to the development of metallurgical research, there was still a vast field open for others. Mr. Bucknall suggested that universities should be given block grants for carrying out research work continuously, untrammelled with the problem of financial sanctions from year to year. Mr. Vatchagandhy also suggested that instead of making piece meal grants, block grants should be given enabling the research scholars to continue their work for a number of years and have some assurance that they could pursue the work until completion. One of the aspects of applied research that needed consideration was the conducting of research on a pilot plant scale, where laboratory studies had reached a stage for full scale investigation. Members were of the opinion that an organization should be set up in the country for designing and fabricating pilot plants, in consultation with research workers. 13.2 <i>Co-ordination of metallurgical research in India</i> The Committee was informed that as recommended at the last meeting, the Sub-Committee consisting of common members of the Advisory Board of the National Metallurgical Laboratory and the Metals Research Committee had submitted a report, which had been circulated to the members. The Sub-Committee had recommended that the Metals Research Committee was best suited to co-ordinate the researches on metallurgical subjects carried out in the country, including the national and private laboratories and universities. The Metals Research Committee should collect information on a broad basis, by issuing a questionnaire. The Committee agreed.

Recommendations of the Committee of the Board	Recommendations of the Board
13.0 p. 47 The Committee noted. 13.1 p. 47 The Committee recommended that the Metals Research Committee be requested to formulate specific proposals for future development of metallurgical research in the country. 13.2 p. 47 The Committee noted that a questionnaire on coordination of metallurgical research in India had already been issued and the matter would be further considered at the next meeting of the Metals Research Committee.	13.0 p. 47 The Board noted. 13.1 p. 47 The Board endorsed the recommendation of its Committee. 13.2 p. 47 The Board noted.

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	13.3 The Chairman suggested that in order to carefully examine the details of the progress reports which were generally of a highly scientific nature and the schemes submitted for undertaking new research work, a sub-committee comprising of Mr. E. H. Bucknall, Mr. J. S. Vatchagandhy, Dr. N. Anjaneyalu and Dr. G. P. Chatterjee be formed and this Sub-Committee should meet about a week or two prior to the meeting of the Metals Research Committee and put up their recommendations to the Metals Research Committee for consideration at the meeting. It was also suggested that if necessary the research workers could be called in to explain personally any points that might require clarification. It was recommended that the B.S.I.R.'s approval be obtained for giving effect to the above suggestion. 13.4 Aluminium coating of steel by Prof. Brahm Prakash, Bangalore. Investigations had been carried out with regard to the effect of titanium and zirconium additions to commercial aluminium to obtain improved coatings on mild steel specimens, by the hot-dip process. Master alloys of aluminium-titanium and aluminium-zirconium had been made successfully. The final report would be submitted. 13.5 Preparation and properties of high purity titanium metal by Dr. D. Swarup and Mr. S. Ramamurthy, Banaras. A patent had been taken on the process for the production of titanium iodide and the work was completed. Dr. Kroll, an international authority on titanium had commended the work. The Chairman had recommended that the National Metallurgical Laboratory could make use of Mr. Ramamurthy's services and if possible, he might be awarded a C. S. I. R. fellowship. 13.6 Investigation on the production, and properties of low carbon alloy steels containing 1 to 5% manganese made with electrolytic manganese by Dr. H. Schrader, Jamshedpur. The final report on the investigation had been circulated. Electrolytic manganese could be used advantageously in the production of low carbon case hardening steels, as a substitute for some types of chrome and nickel alloy steels. Experiments had also been carried out to develop weldable high tensile steels having small quantities of titanium and copper. Further experiments on high tensile steels need to be carried out to determine the weldability and corrosion resistance properties. Mr. Vatchagandhy explained

Recommendations of the Committee of the Board	Recommendations of the Board
13. 3 p. 49 The Committee endorsed the recommendation of the Metals Research Committee on the formation of a Sub-Committee to examine the progress reports and new proposals. It was, however, considered that the Sub-Committee should meet at about the same time as the Research Committee in order not to incur additional expenditure on travelling allowances.	13. 3 p. 49 The Board endorsed the recommendations of its Committee.
13. 4 p. 49 The Committee noted.	13. 4 p. 49 The Board noted.
13. 5 p. 49 The Committee recommended that the D.S.I.R. be authorised to examine in consultation with the National Metallurgical Laboratory the question of giving Mr. S. Ramamurthy a fellowship at the National Metallurgical Laboratory and take necessary action departmentally.	13. 5 p. 49 The Board endorsed the recommendation of its Committee.

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	that the investigation on laboratory scale had been completed, and had reached a stage which required the carrying out of large scale experiments and to find applications for using the steel in commercial production. Mr. Bucknall said that the report submitted by the investigators was a valuable record. Previously manganese steels with above 1½% manganese had received a mixed reception; it was important to continue the studies on the low temperature brittleness properties to determine the effect of manganese. The members were of the opinion that the investigation should not be stopped and that the research work should be continued in collaboration with the National Metallurgical Laboratory. Mr. Vatchagandhy and Mr. Bucknall were requested to put up a scheme. The Committee recommended the publication of the report in the Transactions of the Indian Institute of Metals. 13.7 Production of suitable pig iron for the manufacture of malleable castings. In view of the importance of superior quality iron with low phosphorus and sulphur contents for the manufacture of malleable and other high class castings, Mr. Bhatawadekar was requested to put up a proposal. 13.8 Electro-polishing of bearing surfaces in relation to ferrous metals and alloys. The scheme was at the Indian Institute of Science, Bangalore until May 1953 when it was transferred to the Central Electro Chemical Research Institute, Karaikudi. The scheme was now considered as a routine work of the Central Electro Chemical Research Institute. The Chairman raised the question whether, when a scheme had been sponsored by a Research Committee, could the investigators after some progress had been made, say that they would continue it on their own and the Committee had nothing further to do with it. He suggested that the Research Committee should be kept informed of the progress in schemes in which they were interested. 13.9 Investigation on the causes of inclusion in indigenously manufactured materials. The Committee was informed that the Sub-Committee constituted at the last meeting had reported that as the defects in the steel materials were not of a serious nature, there was no need for the Metals Research Committee to take up an investigation. It had been stated that the problem could be satisfactorily settled by further discussion between the producers, the Government Metallurgical Inspectorate and the Railways. Mr. Bhatawadekar had sent a note to the Chairman giving his remarks on the report. He said that the Indian Railways would have no objection to tyre blanks being made

Recommendations of the Committee of the Board	Recommendations of the Board
13. 6 p. 49-51 The Committee noted with satisfaction the results obtained in the research scheme on 'Low carbon alloy steels containing 1 to 5% manganese' and endorsed the recommendations of the Research Committee that : (i) Mr. Vatchagandhy and Mr. Bucknall be requested to put up a proposal for further investigation, and (ii) The report be published in the Transactions of the Indian Institute of Metals. 13. 7 p. 51 The Committee recommended that Mr. Bhatawadekar be requested to put up a specific proposal for investigation on the production of pig iron for the manufacture of malleable castings. 13. 8 p. 51 The Committee recommended that the Metals Research Committee be kept informed of the progress of research in projects initiated by the Research Committee.	13. 6 p. 49-51 The Board noted and endorsed the recommendations of the Research Committee. 13. 7 p. 51 The Board endorsed the recommendation of its Committee. 13. 8 p. 51 The Board endorsed the recommendation of its Committee.

FUEL RESEARCH AND DEVELOPMENT

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	oversize provided the finish rough machined size was according to the relevant drawings issued by the Central Standards Office. He also stated that if the defects called for rejection of much more than one percent of the components, a dangerous situation must be regarded as existing, calling attention though not necessarily for research. Mr. Bucknall was of the opinion that even though the defects in the railway tyre, as reported, did not call for attention along the lines of research, there was room for improvement in the processing of the materials. Mr. Bucknall and Mr. Vatchagandhy agreed to do the needful in this matter and that there was no need to ask the Metals Research Committee to take any further action. It was agreed that a final report should be drafted taking into consideration the remarks of Mr. Bhatawadekar. Mr. Bhatawadekar thanked both the Metals Research Committee and the Sub-Committee for the trouble they had taken to look into this question and suggest methods for rectifying the defects reported by the Railways. 13.10 Powder metallurgy Dr. Anjaneyalu stated that the ordnance factories were greatly interested in the developments in powder metallurgy and the Metals Research Committee should sponsor research on this subject. Mr. Bucknall said that at the National Metallurgical Laboratory some work was being done and they would consider incorporating in their programme any particular problem that may be suggested by the ordnance factories.
14	Subject : Fuel Research and Development Note : 14.0 The Fuel Research Committee (Chairman : Dr. M. S. Krishanan) considered the following subject at its meeting held on December 20, 1954. 14.1 Standardization of methods for estimation of coal Note submitted by the Director, Fuel Research Institute : "No attempt has so far been made in India to reassess the reserves of coals in the country in a systematic and scientific manner. The Fuel Research Institute

Recommendations of the Committee of the Board	Recommendations of the Board
13. 9 p. 51-53 The Committee recommended that the final report regarding defects in steel materials supplied to the Railways be prepared and sent to the Ministry of Railways as soon as possible.	13. 9 p. 51-53 The Board endorsed the recommendation of its Committee.
13. 10 p. 53 The Committee noted.	13. 10 p. 53 The Board noted.
14. 0 p. 53 The Committee noted.	14. 0 p. 53 The Board noted.

FUEL RESEARCH AND DEVELOPMENT

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	has completed the physical and chemical survey of a number of seams of Jharia and Raniganj coalfields and is going ahead with the survey of other seams in Jharia, Raniganj, Bokaro, Madhya Pradesh coalfields. The accumulation of data available with the Fuel Research Institute, Coal Board and the Coal Commissioner has to be collated and a re-estimation of the reserves of coal in the country is to be made. "There is however, no standard method for the estimation of reserves of coal in this country. In the past reserve estimates were made by the Geological Survey of India giving only summary totals <i>in situ</i> of available reserves. These reserves have not been divided into different classes depending on the relative reliability of data. Reliability of data regarding coal reserves is of great importance to any country, particularly India, embarking upon a plan of large-scale industrial development. Under the five year plan many new proposals for establishment of industries are being considered, and whenever location of industries in a particular area is discussed, the uncertainty of the reserves and the classes of coal required for the purpose has proved to be a definite impediment for planning. A standard method for the estimation of reserves of coal in this country in terms of (1) proved reserves, (2) indicated reserves, and (3) inferred reserves depending on reliable data is, therefore, necessary" Dr. Lahiri mentioned that a Committee had been appointed by the Coal Board for re-estimation of the reserves of coking coal and standardisation of methods for this assessment. The Committee appointed by the Coal Board only consisted of official representatives of the Geological Survey of India, Coal Board, Mines Department and Fuel Research Institute. No non-official members, such as, mining engineers, representatives of professional societies (Mining, Geological and Metallurgical Institute of India and the Geological, Mining and Metallurgical Society of India), trade and industry were included. It was necessary to obtain opinion as well as collaboration of eminent mining engineers and he felt that in the adoption of the standards on a national scale, the Committee should be of sufficiently high level to decide the issues. The Committee agreed with the proposal of Dr. Lahiri and decided that the Committee should be broad based and include representatives of the coal industry and trade, particularly the learned institutions in which there are coal mining people as members.

Recommendations of the Committee of the Board	Recommendations of the Board

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15	Dr. M.S. Krishnan, Chairman of The Fuel Research Committee, has had consultation with the Chairman, Coal Board in this matter subsequently, and has suggested that the Council of Scientific & Industrial Research should take up the question with the Ministry of Natural Resources & Scientific Research and the Ministry of Production and make the existing Committee of the Coal Board representative of all interests.
	14.2 Report of The Director, Fuel Research Institute The Committee was generally satisfied with the work of the Fuel Research Institute.
	Subject : Internal Combustion Engines Research Note :
	15.0 The Internal Combustion Engines Research Committee met on January 2, 1955 with Dr. J. C. Ghosh in the chair.
	15.1 Research on gas turbines The Chairman informed that Prof. O. A. Saunders of the Imperial College of Science and Technology, London, who had been appointed Adviser-member of the Committee on Gas Turbine & Jet Propulsion Engines, arrived in India last November and visited the Bengal Engineering College, Howrah, and the Indian Institute of Science, Bangalore—the two centres of gas turbine research in the country. The recommendations of that Committee, with regard to the scope and nature of gas turbine development work to be undertaken in India in the immediate future, would be placed before the Governing Body of the Council.
	15.2 Electrical dynamometer to be installed at the Indian Institute of Science, Bangalore Prof. Havemann pointed out that whereas the propeller method permitted measurement of power to be made only on a comparative basis, for any absolute measurement of power the proposed swinging field electric dynamometer would be essential. The members felt that since this equipment possessed both research value and utility, it would be worthwhile acquiring it. The Committee agreed with the suggestion of Shri S. L. Kumar that funds might be secured from the U. S. A. under the Technical Assistance Programme, and requested Dr. V. M. Ghatage and Prof. H. A. Havemann to prepare a note on this subject for information of the Planning Commission.

Recommendations of the Committee of the Board	Recommendations of the Board
14. 1 p. 53-57 The Committee noted that the Coal Board had appointed a Committee for re-estimation of reserves of coking coal and standardization of methods for such assessment. The Committee generally agreed with the Fuel Research Committee that the Coal Board Committee should be broad based and include also non-official members from science and industry. The Committee recommended that the DSIR be authorised to take up the matter with the Government of India.	14. 1 p. 53-57 The Board noted and endorsed the recommendation of its Committee.
14. 2 p. 57 The Committee noted.	
15. 0 p. 57 The Committee noted.	
15. 1 p. 57 The Committee noted that the final report of the Committee on Gas Turbine and Jet Propulsion Engines would be considered by the Governing Body of the Council on the 22nd March.	
15. 2 p. 57 The Committee recommended that Dr. V. M. Ghatage and Prof. H. A. Havemann be requested to submit a note on the need for installation of an electric dynamometer for submission to the Planning Commission who may be requested to provide the necessary funds under the Technical Assistance Programme.	
	14. 2 p. 57 The Board noted. 15. 0 p. 57 The Board noted. 15. 1 p. 57 The Board noted. 15. 2 p. 57 The Board endorsed the recommendation of its Committee.

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16	Subject : Chemical Research Note : 16.0 The Chemical Research Committee (Chairman : Dr. K. Venkataraman) in their meeting held on January 3, 1955 made the following recommendations : 16.1 At the suggestion of Dr. J.C. Ghosh the Research Committee recommended that instead of having several committees under the C. S. I. R. there should be one committee on Chemistry & Chemical Technology, if necessary with larger number of members, since the smaller committees had relatively fewer problems to consider. This enlarged committee should meet twice or thrice a year and consider all proposals. This procedure will save considerable expense and simplify work. 16.2 Grants for equipment in respect of schemes The Committee was of the view that grants for equipment which should normally be available in a laboratory for general research purposes should not be recommended. Applications for such grants should be made to the Ministry of Education. Grants for equipment should only be recommended if special equipment designed for the scheme under consideration was required. Grants recommended should normally be for staff, chemicals and breakable apparatus. 16.3 Second Five Year Plan The Chairman would write to the members requesting their views. A draft would then be prepared for consideration by the Committee at a meeting specially convened for this purpose.
17	Subject : Research and Development in Pharmaceuticals and Drugs Note : 17.0 The Pharmaceuticals & Drugs Research Committee (Chairman : Maj. Gen. S. S. Sokhey) in their meeting held on the February 6, 1955 considered the following items and made recommendations :— 17.1 Second Five Year Plan The Chairman stressed the importance of the manufacture of sulpha drugs, antimalarial drugs, etc., in the country as they were equally important for the defence forces and the general health of the country.

Recommendations of the Committee of the Board	Recommendations of the Board
16. 0 p. 59 The Committee noted. 16. 1 p. 59 The Committee was of the opinion that constitution of the Research Committee should generally reflect the future plans of development of scientific research in the country based on a review of the current research effort. In this context Research Committees may need re-inforcement, suspension or creation to deal with developing needs and to fill in gaps in the present efforts. The Committee recommended that the Special Committee of the Governing Body may consider this matter in detail in the light of the above statement and make specific recommendations. 16. 2 p. 59 The Committee endorsed the opinion of the Research Committee. 16. 3 p. 59 The Committee noted that proposals for a programme of chemical research for the Second Five Year Plan were under consideration of a Sub-Committee consisting of Dr. K. Venkataraman, Dr. J. C. Ghosh, Dr. A. Nagaraja Rao, Prof. G. I. Finch, Dr. L. A. Bhatt. 17. 0 p. 59 The Committee noted.	16. 0 p. 59 The Board noted. 16. 1 p. 59 The Board endorsed the recommendation of its Committee. 16. 2 p. 59 The Board endorsed the opinion of the Research Committee. 16. 3 p. 59 The Board noted. 17. 0 p. 59 The Board noted.

RESEARCH AND DEVELOPMENT IN PHARMACEUTICALS AND DRUGS

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	At present the country was entirely dependent on import which took up 85 percent of the drug budget of the country and was a drain on foreign exchange. This could be better spent on setting up much needed basic industries. The country had the talent and technical skill to make itself self sufficient in essential drugs, but needed basic chemical industries (distillation of coal tar industries, calcium carbide, fermentation products, and hydrogenation products) required for manufacture of drugs. This Committee should take up the responsibility of advising the Government on (i) planning for the manufacture of various kinds of drugs consistent with the financial potential of the country, (ii) suggest suitable locations for the industries and (iii) also suggest the types of personnel needed and how they could be trained. It should also provide estimates of costs involved in the manufacture of various drugs. The drugs for this purpose should be divided into three categories : (i) drugs from indigenous medicinal plants (ii) synthetic drugs (hormones, vitamins and essential intermediates) (iii) biological drugs—vaccines, sera and standard products. He suggested further that members and others who could be approached should send their suggestions and information to enable preparation of a proper over-all plan for the Government's Second Five Year Plan. He further stressed that research should not be looked upon as an end in itself. It should be directed to work out large scale production methods of essential drugs required by the country. Mere patent specifications were not enough. As the production methods have to be worked out on pilot plants, suitable public laboratories should be fitted up with such plants. However, fundamental research should also be encouraged in the Universities side by side. After discussion it was finally decided that (i) members will send their suggestions regarding the programme of work for the Second Five Year Plan, to reach the Secretary, Pharmaceuticals & Drugs Research Committee latest by the 28th February 55 and (ii) a Sub-Committee consisting of the following be authorised to prepare the draft report.

Recommendations of the Committee of the Board	Recommendations of the Board

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	Maj. Gen. S. S. Sokhey Chairman
	Dr. B. Mukerji Member
	Prof. T. R. Seshadri
	Col. S. S. Bhatangar
	Dr. K. A. Hamied
	Mr. P. M. Nabar
	Mr. S. P. Sen
	Dr. M. D. Chakravarti
	Dr. S. Dutta
	Dr. D. L. Shrivastava Secretary.
	[In the joint meeting of the P. & D. Research Committee, Pharmacology Advisory Committee of the Indian Council of Medical Research and Medicinal Plants Committee of the Indian Council of Agricultural Research, it was also recommended that this Sub-Committee should collate the reports of various ad-hoc Committees appointed by it.] 17.2 Consideration of a letter from Dr. S. P. Sen, Bengal Chemical & Pharmaceutical Works, Calcutta, regarding difficulties faced in connection with a few solvents The Committee suggested that these points should be incorporated in the note to be submitted to the Planning Commission. 17.3 Inclusion of Mr. P. M. Nabar in the Research Committee The Committee recommended that the Drug Controller of India, Shri P. M. Nabar, be appointed on the Pharmaceuticals and Drugs Research Committee since his presence would greatly help in the deliberations of the Committee. 17.4 Centres for biological testing of products Since a large number of pharmacologists are required to carry on the biological testing of products being prepared in various research centres and since the demand for pharmacologists will go on increasing with the development of pharmaceutical industry in the country, it was suggested that few more centres for pharmacological training and research be started in various parts of the country. To start with it was suggested that three centres may be established at (i) Calcutta, (ii) Madras, & (iii) Baroda, which are also important centres of pharmaceutical industry. It was recommended that the work of the centres be organised on the same basis as the erstwhile centre established under

Recommendations of the Committee of the Board	Recommendations of the Board
17.1 p. 59-63 The Committee generally agreed with the opinion of the Research Committee and recommended the formation of a Sub-Committee as suggested by the Research Committee to draw up a comprehensive plan of research and development during the next 5 years with a view to making the country self-sufficient in drugs and pharmaceuticals. 17.2 p. 63 The Committee noted. 17.3 p. 63 The Committee endorsed the recommendation that Mr. P. M. Nabar be nominated as a member of the Research Committee.	17.1 p. 59-63 The Board endorsed the recommendation of its Committee. 17.2 p. 63 The Board noted. 17.3 p. 63 The Board endorsed the recommendation of the Research Committee.

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	the auspices of this Committee in the Central Drug Laboratory, Calcutta, under Dr. B. Mukerji. The same financial provision would be required for each centre. Dr. C. G. Pandit was asked to prepare the scheme and submit it to the Chairman.																
18	Subject : Biochemical Research Note : 18.0 The Biochemical Research Committee (Chairman : Dr. V. Subrahmanyam) at its meeting held on January 3, 1955, made the following recommendations regarding biochemical research and cognate matters :— 18.1 <i>Publication of the Survey of Fermentation Industries and their Raw Materials in India.</i> Consequent on the death of Dr. G. T. Kale, the Committee requested Prof. M. Sreenivasaya to revise the survey report which had been originally compiled by Mr. Y. N. Trehan. The Committee also recommended that in case some clerical assistance was required, it may be provided. The Chairman has since recommended the following grant for a period of six months :— <table><tr><td>Contingencies</td><td>Rs.</td><td>200</td><td></td></tr><tr><td>Staff :</td><td>Rs.</td><td>840</td><td>(including allowances)</td></tr><tr><td>(One Stenotypist)</td><td></td><td></td><td></td></tr><tr><td>Total :</td><td>Rs.</td><td><u>1,040</u></td><td>-do-</td></tr></table> 18.2 <i>Publication of the review on 'Utilization of micro-organisms for producing food for live-stock from waste materials' by Dr. N. N. Dastur, Bangalore.</i> The Committee considered the draft Review prepared by Dr. Dastur and the comments from the Chief Editor, Publications Division, C. S. I. R. The Committee requested Dr. Dastur to revise the title of the Review if possible and include a preface indicating reasons for devoting greater attention to <i>Torula utilis</i> and <i>Rhodotórula gracilis</i>.	Contingencies	Rs.	200		Staff :	Rs.	840	(including allowances)	(One Stenotypist)				Total :	Rs.	<u>1,040</u>	-do-
Contingencies	Rs.	200															
Staff :	Rs.	840	(including allowances)														
(One Stenotypist)																	
Total :	Rs.	<u>1,040</u>	-do-														

Recommendations of the Committee of the Board	Recommendations of the Board
17. 4 p. 63-65 The Committee recommended that Dr. Pandit be requested to draw up specific proposals for setting up pharmacological centres for consideration of the Research Committee at its next meeting.	17. 4 p. 63-65 The Board endorsed the recommendation of its Committee.
18. 0 p. 65 The Committee noted.	18. 0 p. 65 The Board noted.
18. 1 p. 65 The Committee recommended that Mr. Sreenivasaya be requested to revise and bring up-to-date the survey report on fermentation industry in India and also recommended a grant of Rs. 1040/- for the purpose.	18. 1 p. 65 The Board endorsed the recommendation of its Committee.

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	The Committee felt the necessity of setting up a small pilot plant for the production of fodder yeast and decided to approach the Director, Institute of Sugar Technology Kanpur, to enquire if he could undertake this work in his Institute. Alternatively the possibility of setting up a small plant at the Central Food Technological Research Institute, Mysore, may be explored. 18.3 <i>Preparation of a survey of investigations bearing on the composition, quality and nutritive value of canned foodstuffs as manufactured in India by Dr. G. S. Siddapa and Dr. D. S. Bhatia.</i> The draft note prepared by Drs. Siddapa and Bhatia was discussed. Dr. Bhatia reported that very little information on the composition of canned fish and meat products was forthcoming from the firms engaged in the manufacture of these products but they had collected sufficient data on the composition of canned fruits and vegetables. The Committee agreed to the extension of the time required for the survey. 18.4 The Committee felt that it should meet twice a year, the mid-year meeting being held at Mysore and the annual meeting at one of the National Laboratories by rotation, where work in biochemical and allied fields was in progress. This would provide opportunity to the members to have first hand knowledge of the activities of the particular laboratory. 18.5 <i>Second Five Year Plan</i> The Committee constituted a sub-committee consisting of Dr. V. Subrahmanyan (Convener), Dr. A. Sreenivasan and Dr. P. S. Sarma to draw up draft recommendations for consideration of the Committee.
19	<i>Subject : Research & Development in Essential Oils</i> <i>Note :</i> 19.0 The Essential Oils Research Committee in their meeting held on the 8th January, 1955 at Baroda considered the following items and made recommendations. 19.1 <i>Present position of essential oils industry</i> The Chairman referred to the improved position of the essential oils industry

Recommendations of the Committee of the Board	Recommendations of the Board
18. 2 p. 65-67 The Committee recommended that (i) Dr. Dastur's review on food for live-stock from waste materials be revised and published as suggested by the Research Committee. (ii) The setting up of a pilot plant for fodder yeast either at the Institute of Sugar Technology or at the Central Food Technological Research Institute be explored. 18. 3 p. 67 The Committee recommended that the survey of investigations on canned foodstuffs in India be expedited. 18. 4 p. 67 The Committee recommended that meetings of Research Committee should as far as possible be held in centres where research work in their subjects was carried out. 18. 5 p. 67 The Committee recommended that the constitution of the Sub-Committee for drawing up a programme of Biochemical Research for the Second Five Year Plan be approved and the Sub-Committee be requested to submit its proposals at an early date. 19. 0 p. 67 The Committee noted.	18. 2 p. 65-67 The Board endorsed the recommendations of its Committee. 18. 3 p. 67 The Board endorsed the recommendation of its Committee. 18. 4 p. 67 The Board endorsed the recommendation of its Committee. 18. 5 p. 67 The Board endorsed the recommendation of its Committee. 19. 0 p. 67 The Board noted.

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	in the country and the steady increase in the availability of raw materials for essential oils and the aromatic chemicals which were previously being imported. Orange oil of fine quality (cold compressed) was now being produced in Nagpur, where up to date machinery had been installed. Some foreign and Indian firms had also established factories in India for the production of important essential oils and aromatic chemicals. Prices of lemongrass oil had also improved and there was great demand for the oil from Europe and America. Many plantations previously abandoned had been rehabilitated and planters in Travancore-Cochin and Malabar were taking great interest in the production of the oil. 19.2 The Second Five Year Plan The members were requested to prepare detailed notes and circulate to other members. The matter will be discussed in the next meeting of the Committee which may be specially called for the purpose. 19.3.0 Work on essential oils in the National Laboratories and Research Institutions 19.3.1 Work at the National Chemical Laboratory. The Committee heard an oral report regarding the progress of work on essential oils in the National Chemical Laboratory and recommended that at the next meeting, the various products may be shown to the members. 19.3.2 Work at the Forest Research Institute, Dehra Dun. Chemical studies of natural essential oils at Forest Research Institute were progressing according to the quinquennial programme of research duly approved by the Committee. Regarding cultural investigation of essential oil bearing plants, a complete report will be issued. 19.3.3 Training of a chemist for citrus oil extraction at C. F. T. R. I., Mysore. In view of the recommendation of the Committee for the postponement of

Recommendations of the Committee of the Board	Recommendations of the Board
19. 1 p. 67-69 The Committee noted. 19. 2 p. 69 The Committee noted. 19. 3, 1 p. 69 The Committee endorsed the recommendation of the Research Committee. 19. 3, 2 p. 69 The Committee noted.	19. 1 p. 67-69 The Board noted. 19. 2 p. 69 The Board noted. 19. 3, 1 p. 69 The Board endorsed the recommendation of the Research Committee. 19. 3, 2 p. 69 The Board noted.

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	further investigations on citrus oil extraction, the question of training a chemist was dropped.
19.4.0	<i>Development of essential oils industry in India</i>
19.4.1.1	<i>Khus industry in Uttar Pradesh</i>
	Dr. Dhingra had approached the U. P. Government to place the agricultural farm and tube well at Sarai Mira (Kannauj) at his disposal for development of the khus industry, as recommended by the Committee.
	The Committee recommended that the D. S. I. R. may also take up the matter with the U. P. Government.
19.4.1.2	<i>Import of vetivert slips from Indonesia</i>
	Dr. Dhingra expressed his desire to import 50 vetivert slips from Indonesia. The Committee recommended that the D. S. I. R., may approach the Unesco as well as the Indian Embassy in Indonesia for this purpose.
19.4.1.3	<i>Khus industry in Madras State</i>
	The Chairman has taken up the matter with the Director of Industries and Commerce, Madras for continuing the cultural experiments in important localities in Madras State. He further informed that in Travancore Cochin and Malabar the cultivation of the roots and production of oil is progressing satisfactorily.
19.4.2	<i>Germanium plants</i>
	The Madras Agricultural Department is cultivating this plant in Coonoor and supplying not only cuttings for propagation but also small quantities of oil. Germanium cultivation in Yercaud is continuing.
19.4.3	<i>Camphor trees</i>
	The Committee was informed that existing trees in the Government Botanical Gardens, Ootacamund are in healthy state of growth.

<i>Recommendations of the Committee of the Board</i>	<i>Recommendations of the Board</i>
19. 3. 3 p. 69-71 The Committee noted.	19. 3. 3 p. 69-71 The Board noted.
19. 4. 1. 1 p. 71 The Committee recommended that the U. P. Govt. be requested to provide necessary facilities to the Director of Harcourt Butler Institute of Technology at Kannauj as suggested by the Research Committee.	19. 4. 1. 1 p. 71 The Board endorsed the recommendation of its Committee.
19. 4. 1. 2 p. 71 The Committee noted that the Indian Embassy at Jakarta had already been requested to procure vetivert slips from Indonesia for experimental cultivation in India.	19. 4. 1. 2 p. 71 The Board noted.
19. 4. 1. 3 p. 71 The Committee noted.	19. 4. 1. 3 p. 71 The Board noted.
19. 4. 2 p. 71 The Committee noted.	19. 4. 2 p. 71 The Board noted.
19. 4. 3 p. 71 The Committee noted.	19. 4. 3 p. 71 The Board noted.

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19.4.4	Linaloe oil The Madras Forest Department has started propagating the tree in Denkanikotta and rooted cuttings will be made available in small quantity shortly. No supplies of seeds have been received from the Indian representative in Mexico, so far. It was recommended that the matter may be referred to the Unesco and also to the Indian Embassy in Paris as Mr. Goldstein reported that this tree is grown in the French colony of Cayenne (French Guiana, S. America)
19.4.5	Lemon grass oil industry The Chairman pointed out that the industry was looking up as there was a good demand for the oil from foreign countries, specially America. The need to put the lemongrass oil industry on a firm basis was discussed in the light of information that synthetic citral production in U. S. A. and Europe would be potential competitor. It was decided to take up the question again at the next meeting. With regard to the question of weeding out the white grass growing in the lemon-grass fields, the Madras Government has replied that there was no large scale systematic cultivation of lemongrass in the Madras State and the weeding out of the grass in the forest area is not considered either worthwhile or economic. Travancore-Cochin Government had not yet replied. The Chairman also informed the Committee that a Control Laboratory is being established in Cochin by the Ministry of Food and Agriculture for enforcing suitable quality control measures on the export of lemongrass oil and sandalwood oil under the AGMARK rules. The rigorous tests of the laboratory will automatically stop adulteration.
19.4.6	Rosha grass and Java citronella Some members were of the opinion that it may be advisable to introduce rosha grass (Motia) and Java citronella grass in different localities in South India where climatic and soil conditions were favourable. It was also brought to the notice of the Committee by Dr. Dhingra that rosha grass was being cultivated on a systematic scale at Doiwala (Dehra Dun)

Recommendations of the Committee of the Board	Recommendations of the Board
19. 4. 4 p. 73 The Committee noted and also recommended that the Indian Representatives at Paris and Mexico be requested to procure linaloe seeds at an early date from French Guiana and Mexico respectively.	19. 4. 4 p. 73 The Board noted and endorsed the recommendation of its Committee.
19. 4. 5 p. 73 The Committee noted with satisfaction the development of the Lemon Grass Oil Industry.	19. 4. 5 p. 73 The Board noted.
19. 4. 6 p. 73 The Committee recommended that the Research Committee be requested to formulate definite proposals for the introduction of rosha grass and Java citronella in South India.	19. 4. 6 p. 73 The Board endorsed the recommendation of its Committee.

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19.4.7	Davana and patchouli oils The Chairman showed the members samples of davana oil and patchouli oil received from Dr. B. V. Ramaswamy, Consulting Chemist, Bangalore. Prof. Kaul wanted a specimen of Davana plant for botanical identification. The Chairman also showed the members a sample of patchouli oil of recent distillation received from Dr. Bannerjee, Institute of Science, Bangalore. The quality was considered to be good.
19.4.8	Essential oil plants and oils available in Kashmir State Mr. Handa of the Drug Research Laboratory, Jammu brought to the notice of the Committee that the following plants grow abundantly in the Kashmir State : Costus root Acorus calamus Linn Angelica glauca Cedrus deodara He wanted information as to whether he could find a sale for the material as well as for the oils distilled from them. Mr. Handa agreed to send samples of oils, etc. to the Chairman and also to Mr. Goldstein.
19.4.9	Utilisation of waste land for cultivation of essential oil plants Prof. Kaul informed that he had applied to the Government of India for the grant of waste land where food crops could not be grown for the cultivation of plants of economic value, including essential oil bearing plants. The Committee recommended that the D. S. I. R. may be requested to take early action in the matter.
19.5.0	Import and export of essential oils and oil bearing seeds
19.5.1	Reduction of customs duty on patchouli leaves The matter has been taken up again with the concerned Department of the Government of India.
19.5.2	Indo-Norwegian Trade Agreement Dr. Sadgopal had recently invited the attention of the Committee to the Indo-Norwegian trade agreement and had enquired as to what items were included in industrial aromatics available for export from Norway to India.

Recommendations of the Committee of the Board	Recommendations of the Board
19.4.7 p. 75 The Committee noted.	19.4.7 p. 75 The Board noted.
19.4.8 p. 75 The Committee recommended that the Research Committee be requested to consider the question of exploitation of the essential oil bearing plants growing in Kashmir and submit specific proposals.	19.4.8 p. 75 The Board endorsed the recommendation of its Committee.
19.4.9 p. 75 The Committee endorsed the recommendation of the Research Committee.	19.4.9 p. 75 The Board endorsed the recommendation of the Research Committee.
19.5.1 p. 75 The Committee noted that the Govt. of India had since reduced the customs duty on import of patchouli leaves into India to 31 1/4%.	19.5.1 p. 75 The Board noted.
19.5.2 p. 75 The Committee noted that samples of industrial aromatics from Norway had been shown to members of the Research Committee.	19.5.2 p. 75 The Board noted.

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19.5.3	Export of essential oil bearing seeds Prof. Kaul informed the members that the question of improvement of the quality of essential oil bearing seeds has been taken up by the Medicinal Plants Committee of the I. C. A. R. The Committee requested the Secretary, C. S. I. R. to contact I. C. A. R. and to find out as to what action has been taken in the matter. The Committee was of the opinion that emphasis should be placed on the improvement of the oil content of the essential oil bearing seeds with due regard to the quality of the oil. The members were of the view that there should be no ban on the export of essential oil bearing seeds as these are dollar earning commodities.
19.5.4	Orange oil Samples of orange oil sent by M/s Chocs Canning Co., Nagpur were shown to the members who approved the quality generally but thought that it could be improved by adopting better methods of production and also addition of suitable preservatives. The Committee recommended that there should be no ban on the import of this oil till such time that the country was able to produce oils of suitable quality in sufficient quantities and further that consumers should be allowed to import freely and not made to depend on supplies by dealers.
19.5.5	Ginger oil and oleo-resin M/s Techno-Chemical Industries, Calcutta, have furnished the break up of cost of ginger oil. M/s A. Boake Roberts Co., of London who have established a factory in Madras can supply all the requirements of ginger essence and oleoresin ginger etc. at favourable rates. The question of banning the import can be taken up, if the demands of the country could be met by the local producers.
19.6.0	Publications
19.6.1	Report on the Survey of Indian Roses by Dr. K. Biswas, Calcutta. The manuscript received from Dr. Biswas was revised by Dr. Sadgopal & Mr. Goldstein and sent to the Secretary, C. S. I. R., for publication. It was suggested that suitable illustrations of the species of roses dealt with in the survey should be incorporated in the publication. The Committee considered that the printing should not be held up for the illustrations and should be started without delay. Dr. Dhingra and Prof. Kaul agreed to send coloured illustrations of the four species namely; Rosa damascena, Rose Edward, Rose Teplitz and 'His Majesty'.
19.6.2	Monograph on jasmine The manuscript was being edited by Dr. Sadgopal and Mr. M. B. Raizada.

Recommendations of the Committee of the Board	Recommendations of the Board
19. 5. 3 p. 77 The Committee endorsed the recommendations of the Research Committee.	19. 5. 3 p. 77 The Board endorsed the recommendations of the Research Committee.
19. 5. 4 p. 77 The Committee endorsed the recommendation of the Research Committee.	19. 5. 4 p. 77 The Board endorsed the recommendation of the Research Committee.
19. 5. 5 p. 77 The Committee noted.	19. 5. 5 p. 77 The Board noted.
19. 6. 1 p. 77 The Committee recommended that publication of the monograph on Indian Roses be expedited.	19. 6. 1 p. 77 The Board endorsed the recommendation of its Committee.
19. 6. 2 p. 77 The Committee recommended that publication of the monograph on Jasmine be expedited.	19. 6. 2 p. 77 The Board endorsed the recommendation of its Committee.

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19.6.3	Review of the work on citrus species carried out so far in various institutions in India, by Dr. S. C. Bhattacharyya Copies of the review were supplied to the members. Dr. Bhattacharyya has made some useful recommendations for developing the industry in India. The Committee considered the report and recommended that it should be printed as a separate publication with the addition of fresh information since made available by the Central Food Technological Research Institute, Mysore and Harcourt Butler Technological Institute, Kanpur. It was pointed out by Mr. Goldstein that citrus oil industry could be developed economically only as an adjunct to the fruit juice and fruit processing industry. In view of this, further investigation on citrus oil extraction was not considered necessary. Technical advice however could be provided by the Research Committee to parties interested in the industry. The question of the preparation of petitgrain oil and neroli oil was also discussed. It was suggested that the report submitted by Dr. Malaviya may be consulted, to ascertain whether suitable species of bitter orange trees were found in the country to enable their cultivation being taken up as and when necessary. Prof. Kaul was requested to advise on the methods to be adopted for the propagation of the trees.
19.6.4	Monograph on Aromatic Plants of India Prof. Kaul had discussed the matter with Dr. Krishna and necessary steps are being taken to complete the remaining parts of the monograph.
19.6.5	Review of the work of the Committee The work was in progress and would be published along with the supplement of the Exploratory Committee's report.
19.7	Nomination of representatives of the Ministry of Commerce & Industry and the Ministry of Agriculture on the Essential Oils Research Committee The Committee recommended that a representative each of the Ministry of Commerce & Industry and the Ministry of Agriculture be nominated to the Essential Oils Research Committee as their advice would be helpful on various matters connected with these Ministries which cropped up during discussions in the meeting of the Research Committee.

Recommendations of the Committee of the Board	Recommendations of the Board
19. 6. 3 p. 79 The Committee endorsed the recommendations of the Research Committee and further recommended that the review of research on citrus oils be published as soon as possible.	19. 6. 3 p. 79 The Board endorsed the recommendation of its Committee.
19. 6. 4 p. 79 The Committee noted that the completion of the Monograph on Aromatic Plants of India had been long delayed. It was recommended that Research Committee be requested to take appropriate steps to complete the work and the DSIR be authorised to sanction such grants as would be necessary for the purpose.	19. 6. 4 p. 79 The Board noted and endorsed the recommendation of its Committee.
19. 6. 5 p. 79 The Committee noted and recommended that the Chairman of the Research Committee be requested to expedite the revision of the Report of the Essential Oils Exploratory Committee.	19. 6. 5 p. 79 The Board noted and endorsed the recommendation of its Committee.
19. 7 p. 79 The Committee endorsed the recommendation of the Research Committee that representatives of the Ministry of Commerce and Industry, and Agriculture be coopted on the Essential Oils Research Committee.	19.7 p.79 The Board endorsed the recommendation of the Research Committee.

Item No.	Particulars
20	Subject : Research and Development in Vegetable Oils Note : 20.0 The Vegetable Oils Research Committee (Chairman : Prof. T. R. Seshadri) in its meeting held on 12 January 1955 considered the following items and made recommendations. 20.1 <i>Use of castor oil as lubricant by Indian Railways</i> The Indian Central Oilseeds Committee had written to the C. S. I. R. expressing concern at the growing use of mineral lubricants by Railways for purposes where castor oil could be used. It was considered that in view of the price of castor oil having gone down considerably, it may be feasible for the Railways now to employ the oil as lubricant for locomotives and for axle lubrication. Recommendation may be made to the Railways that they might use castor oil as well as other suitable vegetable oils (groundnut oil, mustard oil, etc.) for locomotive and axle lubrication. It was also recommended that the Government of India may be requested to remove the levy of export duty on castor oil. 20.2 <i>Scheme on the utilisation of oils of pungam and pinnai in industry</i> The Indian Central Oilseeds Committee had desired to have the views of the Vegetable Oils Research Committee on this work to be taken up at the Oil Technological Institute, Anantapur. It was felt that (i) utilisation of the oils in soap industry and (ii) manufacture of sulphonated oils and other detergents, may be studied. Under item (iii) namely utilisation of the oils in the manufacture of oleic acid, only Karanja oil may be examined. Regarding item (iv) preparation of metallic soaps, (v) use of the oils in leather manufacture, the Central Leather Research Institute, Madras may be contacted for ascertaining as to the difficulties which should be removed to make Karanja oil more useful in the industry. (vi) Use of the oils in the treatment of skin diseases and (vii) possibility of the their conversion to paint oils need not be studied. 20.3 <i>Utilisation of cottonseed oil</i> The Committee noted that a few oil mills in India were also producing cottonseed oil of good quality. M/s Lever Bros. and Tata Oil Mills are already reported to be using it for vanaspati manufacture. The Oil Technological Research Institute at Anantpur is engaged in the study of the milling and refining of the cottonseed oil from Indian varieties of cottonseeds. Other laboratories including the National Chemical Laboratory are

Recommendations of the Committee of the Board	Recommendations of the Board
20. 0 p. 81 The Committee noted. 20. 1 p. 81 The Committee recommended that the Ministry of Railways be requested to consider the use of castor oil and other indigenous oils as lubricants in Indian Railways as far as possible. The Committee noted that the Government of India had since taken steps to help export of castor oil. 20. 2 p. 81 The Committee noted that the opinion of the Vegetable Oils Research Committee had since been conveyed to the Indian Central Oilseeds Committee.	20. 0 p. 81 The Board noted. 20. 1 p. 81 The Board noted and endorsed the recommendation of its Committee. 20. 2 p. 81 The Board noted.

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	also doing work on the refining of the oil. The results will be published as and when ready.
20.4	<i>Establishment of a Central Oil Technological Institute</i> The Committee felt that one Central Institute of the type mentioned will be necessary for India. Since the Indian Central Oilseeds Committee has already a programme to establish this Institute under its auspices it may not be necessary for the Council of Scientific & Industrial Research also to proceed in that direction. The Council of Scientific & Industrial Research could, however, give its active cooperation to this scheme.
20.5	<i>Second Five Year Plan</i> It was suggested that special attention may be given to the following: (1) production of greases in India to cut out import, (2) conservation of glycerine resources of India.
20.6	<i>Modification of mowrah fat by Dr. J. G. Kane, Bombay.</i> The Committee recommended that Dr. Kane may be requested to submit a consolidated report of the results obtained.
20.7	<i>Khakan fat (Pilu oil) as a substitute for coconut oil in soap by Dr. J. S. Aggarwal, National Chemical Laboratory, Poona.</i> The report was circulated and after a full discussion the following recommendations were made: Half a ton of Khakan fat may be supplied by the Council of Scientific & Industrial Research costing about Rs. 800/- free of charge to Mr. Om Prakash, Oil Expert to the U. P. Government for conducting experiments on soap making. Dr. Godrej offered to conduct experiments on a large scale using 12 tons of the fat for conversion into fatty acids. The results could then be used by small soap manufacturers for the manufacture of soap. The cost will be borne by Dr. Godrej.
20.8	<i>Report on the discussion with the Planning Commission on neem oil by Dr. J. S. Aggarwal, National Chemical Laboratory, Poona.</i> Dr. Aggarwal was requested to make a briefer report embodying the latest results obtained in the National Chemical Laboratory. This report will be circulated and then submitted to the Council of Scientific & Industrial Research for transmission to the Planning Commission.

Recommendations of the Committee of the Board	Recommendations of the Board
20.3 p. 81-83 The Committee noted.	20.3 p. 81-83 The Board noted.
20.4 p. 83 The Committee was of the opinion that the proposed Central Oil Technological Research Institute should work in the closest collaboration with the C. S. I. R. The Committee recommended that the DSIR may take up the question with the Central Oil Seeds Committee and the Ministry of Agriculture for detailed examination.	20.4 p. 83 The Board endorsed the recommendation of its Committee.
20.5 p. 83 The Committee recommended that the Research Committee be requested to formulate specific proposals regarding production of greases and conservation of glycerine resources in India.	20.5 p. 83 The Board endorsed the recommendation of its Committee.
20.6 p. 83 The Committee recommended that Dr. Kane be requested to submit the final report on modification of mowrah fat.	20.6 p. 83 The Board endorsed the recommendation of its Committee.
20.7 p. 83 The Committee recommended that the DSIR be authorised to take necessary action to make available to Dr. Godrej sufficient quantities of pilu oil for large scale experiments on its use as substitute for coconut oil in soap making.	20.7 p. 83 The Board endorsed the recommendation of its Committee.
20.8 p. 83 The Committee recommended that the National Chemical Laboratory be requested to expedite the report on neem oil.	20.8 p. 83 The Board endorsed the recommendation of its Committee.

PLASTICS RESEARCH AND DEVELOPMENT

Item No.	Particulars
21	Subject : Plastics Research & Development <i>Note :</i> 21.0 The Plastics Research Committee in its meeting held on the 28th January, 1955 considered the following items and made recommendations : 21.1 Construction of osmometers suitable for high polymer research by Dr. Santi R. Palit, Calcutta Work in the scheme had been completed. The Committee recommended that Dr. Palit should give in his report as well as in the final paper for publication, detailed working drawings of the testing instruments and other information necessary for the production of osmometers by likely manufacturers. 21.2 Manufacture of containers for batteries by The National Chemical Laboratory, Poona M/s Associated Battery Makers (Eastern) Ltd., Calcutta were supplied by the National Chemical Laboratory with the necessary samples for producing test pieces. The mixing technique for use of Indian asbestos differed from that for imported asbestos. The firm had not got the necessary equipment and so the National Chemical Laboratory prepared the mix in small batches and supplied to the firm for trials. It was pointed out that the new trend was for the use of hard rubber for battery containers. Asbestos-bitumen compositions were losing ground. The Committee recommended that the work should be completed by the end of March 1955 and the Committee have a report. Dr. Banerjee would make enquiries from the Battery Manufacturers' Association as to the preference for hard rubber as against asbestos-bitumen compositions and the relative proportion of the two compositions used at present as also the future trends. 21.3 Development of plasticizers based on available raw materials for cellulose nitrate, cellulose acetate, polyvinyl chloride and copolymers Shri Kamath explained that the 'Survey of Research Problems in Plastics' gave information about plasticizers he had in mind. It was noted that a few firms in India had already undertaken the manufacture of plasticizers and most of the common plasticizers would become commercially available soon.

Recommendations of the Committee of the Board	Recommendations of the Board
21.0 p. 85 The Committee noted. 21.1 p. 85 The Committee recommended that Dr. Palit be requested to submit a detailed report on the construction of osmometers for publication and circulation to instrument manufactures. 21.2 p. 85 The Committee recommended that National Chemical Laboratory be requested to complete the work on battery containers as soon as possible and furnish a report.	21.0 p. 85 The Board noted. 21.1 p. 85 The Board endorsed the recommendation of its Committee. 21.2 p. 85 The Board endorsed the recommendation of its Committee.

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	The rubber industry also used plasticizers and softners. In Germany an electrically conducting softener had been developed for use with textile spinning cots. Dr. Banerjee agreed to send a sample of this softener to the National Chemical Laboratory for investigation and to write a note regarding the softeners required by the rubber industry. The Committee recommended that the National Chemical Laboratory should undertake work on electrically conducting softeners of the type Dr. Banerjee had mentioned as well as on those which could be developed from sebacic acid. 21.4 Investigation on the electrochemical properties of resin systems in relation to reactions involving exchange of ions by Dr. B. N. Ghosh, Calcutta The Committee noted that the work was being carried out under the Chemical Research Committee. Progress reports were also being received by the Plastics Research Committee. 21.5 Exhaustive investigation on cotton linters with a view to utilize the same as a raw material for the (a) manufacture of cellulose derivatives, including regerated cellulose, (b) filler for urea-formaldehyde resins The Committee noted that the Technological Laboratory, Indian Central Cotton Committee, Bombay was carrying out work on cotton linters and was mainly interested in classifying different types of linters available in India. The Committee was informed that the National Chemical Laboratory had discontinued pilot plant work on cotton linters and preparation of alpha cellulose from cotton waste. As regards studies on the use of cotton linters as fillers for urea-formaldehyde resins it was noted that little work had been done on the project. Dr. Banerjee stated that a study on the use of cotton linters for imparting greater tear resistance to V-belts was being carried out in the laboratories of his firm. 21.6 Monomers for research work The Committee noted that orders had been placed for obtaining monomers. It would perhaps take three months to get supplies. The Committee recommended that the Council of Scientific & Industrial Research may be requested to expedite the supply.

Recommendations of the Committee of the Board	Recommendations of the Board
21. 3 p. 85-87 The Committee recommended that the National Chemical Laboratory be requested to take up the development of electrically conducting softeners for the manufacture of textile spinning rubber cots in India. 21. 4 p. 87 The Committee noted.	21. 3 p. 85-87 The Board endorsed the recommendation of its Committee. 21. 4 p. 87 The Board noted.
21. 5 p. 87 The Committee noted and recommended that the Plastics Research Committee and the Cellulose Research Committee be requested to draw up a programme of research on the utilisation of cotton linters in India.	21. 5 p. 87 The Board noted and endorsed the recommendation of its Committee.
21. 6 p. 87 The Committee recommended that the Stores Department in the Indian High Commissioner's Office in London be requested to expedite the supply of the monomers.	21. 6 p. 87 The Board endorsed the recommendation of its Committee.

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21.7	Article for the the JSIR by Dr. S. R. Palit The Committee agreed that Dr. Palit could discuss the question with the Chief Editor and take necessary steps in the matter.
21.8	Synthetic polyelectrolytes as soil conditioners Representative of the I. A. R. I., Dr. Raychaudhuri, explained that it was necessary to undertake work on soil conditioners in three parts, (a) preparation of the soil conditioner in the laboratory, (b) their testing with soils on a laboratory scale and (c) extensive field trials. The Soil Science Committee of the Indian Council of Agricultural Research favoured work being carried out on this problem and the Soil Science Committee was now devising a plan for this work. The problem had countrywide implications and it was necessary to make a co-operative effort to achieve useful results. The Committee recommended that Dr. Palit should attend the next meeting of the Soil Science Committee of the Indian Council of Agricultural Research and that the results of the deliberations of that Committee be awaited.
21.9	Development of suitable synthetic resin for photoelastic models The demand for the material in India did not justify taking up research.
21.10	<i>Second Five Year Plan</i> The Chairman pointed out that to evolve a co-ordinated plan for work it was necessary to take into consideration : (i) a judicious distribution of problems selected from the 'Survey of Research Problems in Plastics'; (ii) establishment of a broad-based liaison with plastics industries, research institutes working on plastics and other CSIR Research Committees whose work touches closely that of the Plastics Research Committee; (iii) recommendations for starting new industries. A number of suggestions were made regarding how the schemes in the 'Survey of Research Problems in Plastics' could be grouped and distributed. Dr. Banerjee indicated that he would send a list of problems in the field of rubber which he wished to see worked out to the Chairman and Dr. Palit. The Chairman pointed out that it should be the aim not to overload the available facilities. The Committee should collect and arrange these problems, and send a list of these problems to laboratories interested in research in plastics, and enquire which of the problems they would like to work up.

Recommendations of the Committee of the Board	Recommendations of the Board
21. 7 p. 89 The Committee noted.	21. 7 p. 89 The Board noted.
21. 8 p. 89 The Committee noted that the Soil Science Committee of the I. C. A. R., had since met.	21. 8 p. 89 The Board noted.
21. 9 p. 89 The Committee noted.	21.9 p. 89 The Board noted.

Item No.	Particulars
	The Committee recommended : (i) that a Subcommittee consisting of Dr. Santi R. Palit (Convener), Dr. D. Banerjee, Dr. C. L. Gupta and Shri S. S. Nayudu, be formed to carry out the work of preparing a programme of distribution to various laboratories of problems selected from the 'Survey'; (ii) that this Subcommittee should get views of laboratories, besides those represented on the Research Committee and especially of the following, on the problems which they would like to work with estimates of the financial assistance required : Forest Research Institute, Dehra Dun. Fuel Research Institute, Dhanbad. Harcourt Butler Technological Institute, Kanpur. Indian Institute of Science, Bangalore. Indian Institute of Technology, Kharagpur. Indian Lac Research Institute, Ranchi. Lucknow University, Lucknow. Madras University, Madras. Sri Ram Institute for Industrial Research, Delhi; (iii) that Dr. Banerjee, Dr. Gupta and Shri S. S. Nayudu would undertake the task of obtaining the views of the members of their respective Associations and allied organisations; Dr. Kudva would also help regarding the problems of interest to the paints industry; (vi) that this Subcommittee should finish this work within two months and and it should be given assistance by posting a Senior Technical Assistant in Calcutta for the required period; (v) that after the views are obtained, the Committee would meet again to finalize the plan and assign priorities, if possible, in the light of the Second Five Year Plan of the Government of India. 21.11 Liaison with other Committees Each Research Committee should have information about the work already done, in progress and contemplated to be undertaken by other Research Committees. Very often the work of one Committee can be of great help to other Committees. As an

Recommendations of the Committee of the Board	Recommendations of the Board
21.10 p.89-91 The Committee endorsed the recommendations of the Research Committee with regard to the preparation of a programme of research in Plastics and allied industries for the next Five Year Plan.	21.10 p.89-91 The Board endorsed the recommendations of the Research Committee.

Item No.	Particulars
	example, the Plastics Research Committee which deals with problems relating to plastics, paints, varnishes, enamels, rubbers, etc., would be interested to know the work being done by such Research Committees as the Chemical, Vegetable Oils, Cellulose, Leather, etc. Even the work of Physical, Radio and Building Research Committees would be of assistance. It is, therefore, suggested that reciprocal exchange of information among the various Committees should be extended as much as possible. It may also prove useful to consider the idea of holding group meetings of several related Committees, once in two or three years. The Committee recommended that representatives of Industries' Associations on the Committee should bring the objectives and the work of the Plastics Research Committee to the notice of the members of their Associations and also give more publicity to Plastics Research Committee in the meetings of their Associations, to make the Plastics Research Committee more useful to the Industry. 21.12 Starting new industries The Development Wing of the Ministry of Commerce & Industry was already looking after this aspect and their representative was already on the Committee. Schemes on manufacture of polystyrene and urea-formaldehyde resins, suggested by members, were being considered by the Development Wing.
22	Subject : Leather Research and Development <i>Note :</i> 22.0 The Leather Research Committee at its meeting held on 7th January, 1955 considered the following matters and made recommendations : 22.1 Central Leather Research Institute A report of the work carried out by the Central Leather Research Institute according to the programme of research approved by the Committee was placed on the table. The samples of various types of leather produced by research at the Institute were shown to the members. The Committee recorded appreciation of the work done. Both the long and short term programmes had been taken up at the Central Leather Research Institute as could be seen from the report of the work of the Central

Recommendations of the Committee of the Board	Recommendations of the Board
21.11 p.91-93 The Committee recommended that the DSIR may arrange for exchange of progress reports of research projects between the concerned Research Committees. The Committee also recommended that representatives of Manufacturer's Associations on the C. S. I. R. Research Committees be requested to bring about effective liaison between their Associations on the one hand and the C. S. I. R. organisations on the other.	21.11 p.91-93 The Board endorsed the recommendations of its Committee.
21.12 p.93 The Committee noted.	21.12 p.93 The Board noted.
22.0 p.93 The Committee noted.	22.0 p.93 The Board noted.

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	Leather Research Institute circulated. As desired by the Madras Government work had also been taken up on (i) the curing of hides and skins and (ii) on vegetable tan-stuffs of Madras forests. Good results had been obtained from the latter investigation. It had been recommended that the experiments on cultivation and cross breeding of the different tanning plants be carried out at the Central Leather Research Institute in collaboration with the Forest Research Institute as this arrangement would expedite the investigation. Work on the formation of standards for South Indian tanned kips and skins had been done and draft specifications had been sent to the Indian Standards Institution for them to take further steps in the matter. The Government of India had desired that a scheme should be evolved for stopping the export of adulterated tanned goat and sheep skins. A Committee was appointed by the Government of India for this purpose which have drawn up a scheme and sent it to the Ministry of Commerce and Industry which is now considering its implementation. According to this scheme tanned goat and sheep skins for export should be sampled from the harbour and samples should be sent to the Central Leather Research Institute for analysis and report. This scheme has at present fixed very liberal standards to allow the trade to get used to control. Mr. M. Banerjee pointed out that this would involve hardship to Calcutta region as quite a large number of skins were also sent from Calcutta for export and suggested that analytical work could also be undertaken at the Government Tanning Institute, Calcutta and certificates issued by them should also have recognition. The Chairman said that this might be done later. 22.2 Proposals for the Second Five-Year Plan The Committee considered a note by the Director, Central Leather Research Institute on the programme of scientific research for the improvement and expansion of the Indian Leather Industry during the Second Five Year Plan. The Committee approved of the note and recommended that it may be sent to the Council of Scientific & Industrial Research. List of research projects contained in the note : Electron microscopy of hide protein, finding out of protein configuration etc., in collaboration with N. C. L. & N. P. L.

Recommendations of the Committee of the Board	Recommendations of the Board
22.1 p.93-95 The Committee noted and endorsed the recommendation of the Research Committee.	22.1 p.93-95 The Board noted and endorsed the recommendation of the Research Committee.

LEATHER RESEARCH AND DEVELOPMENT

<i>Item No.</i>	<i>Particulars</i>
	X-ray studies of hide proteins. Research on synthetic resins with regard to their preparation and use in leather manufacture—in manufacturing syntans, resin pigment finishes, impregnating leather etc. Research in the colloidal and physical chemistry of leather. Research on manufacture of new depilant e.g., sodium sulphhydrate, methyl amine etc. Physical constants of leather. Utilisation of natural products such as resins, oil etc. in leather manufacture. Constitution and structure of vegetable tannins. Research on the waste sulphite cellulose liquors of paper mills to prepare sulphite cellulose extracts for tanning. Research on the manufacture of exchange resins, activated charcoal and re-inforced fuel briquettes from the spent tan. Research on making sulphite cellulose extracts for tanning from other cellulose products. Research on making nitrocellulose, acetyl cellulose etc. for preparing leather finishes. Research on cellulose products for making syntans from them. Research on making wood flour for use in the manufacture of synthetic bates. Research on manufacture of cheap paper pulp from spent tan and other cellulose substances to be used in making leather boards in combination with leather shaving. Bacteriological study of common salt to find out the incidence of halophilic chromogenic bacteria in them which may cause red heat, salt stains etc., on hides and skins if they are cured with the salts. Study on the limits of bacterial action in soaking, liming, bating etc., which may not influence leather quality.

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

Item No.	Particulars
23	Research to find out suitable preservatives to prevent bacterial action in soaking, liming, bating etc.
	Research to prevent fungal growth on process hides and skins and leather.
	Study of enzyme action in leather manufacture.
	Research on deriving enzymes suitable for use in leather manufacture from plant and animal sources.
	A thorough study of Indian hides and skins to find out their basic fibre structures and the changes in the structure due to old age, sex, region of origin, malnourishment, disease etc., and to find out how far the defects can be remedied by modifications of tanning techniques.
	Study of the cellular proteins particularly the inter fibrillary matter of skin and their effect upon the pelt and leather.
	The part played by "Reticulin" in the making of leather.
	Study of the post-mortem changes in the fibrous tissue of the skin to find out the nature of defects caused by biological agencies.
	<i>Subject : Cellulose Research</i>
	<i>Note :</i>
	23.0 The Cellulose Research Committee (Chairman: Dr. B. K. Vaidya) at its meeting held on January 3, 1955, considered the following subjects.
	23.1 <i>Raw materials for cellulose</i>
	The work done in the Indian Central Cotton Committee Laboratories, Bombay, was very valuable. However, further work was necessary to investigate in greater detail some of the promising raw materials. Dr. Nanjundya said that he hoped to pursue this matter closely in the near future.
	23.2 <i>Work on cotton linters</i>
	Samples of chemical pulp for utilisation in rayon (viscose) manufacture were made from cotton linters by the National Chemical Laboratory, but the work had to be abandoned on account of lack of suitable equipment. Dr. Thoria remarked that some correspondence had taken place between him and the Director, National Chemical

Recommendations of the Committee of the Board	Recommendations of the Board
22. 2 p. 95-99 The Committee recommended that the programme of research for the development of Indian Leather Industry during the Second Five Year Plan drawn up by the Director of the Central Leather Research Institute be generally approved. The Committee also recommended that the Research Committee be requested to make specific proposals to implement this programme having regard to the facilities available at the Central Leather Research Institute and other Research Institutions in the country.	22. 2 p. 95-99 The Board endorsed the recommendations of its Committee.
23. 0 p. 99 The Committee noted.	23. 0 p. 99 The Board noted.
23. 1 p. 99 The Committee noted.	23. 1 p. 99 The Board noted.

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	Laboratory, which he would forward to the Chairman. The N. C. L. report giving some of the results of the experiments carried out could be also scrutinised.
	23.3 Preparation of alkali and water soluble cellulose ether
	Dr. Nanjundayya said that with the establishment of the chemical section in his laboratory, it would be possible for him to take up this work. It was suggested that Dr. Nanjundayya may put up a scheme for consideration of the Committee.
	Subject : Building Research
	Note :
	24.0 The Building Research Committee met on Jan. 5, 1955 at Baroda with Maj. Gen. H. Williams in the chair and considered the following matters :—
	24.1 The Chairman in his opening remarks stated that the Central Govt. had now constituted an adequate number of organisations for encouraging both basic and applied research and for effectively applying the results. Much work remained to be done, and towards this he appealed for the help and cooperation of all the members.
	There is an immediate role for bodies like the National Building Organisation, the National Research Development Corporation, the Experimental Housing Division and the Rural Housing Cell to apply the results of all available knowledge from research, both foreign and local.
	The Committee strongly recommended the provision by the Council of Scientific & Industrial Research of a suitably qualified Technical Assistant to look after the day to day work of this Committee, since its work was expanding and a whole-time person was necessary to tackle this work.
	24.2 Second Five Year Plan
	The Chairman suggested that a list of the most urgent problems should be made and categorized under priorities for circulation among research institutes in the country, including universities and technical colleges, to ascertain how far they were interested in taking up items of investigation. Simultaneously it could be made known that the Building Research Committee would recommend grants where assistance was deemed necessary.

Recommendations of the Committee of the Board	Recommendations of the Board
23.2 p.99-101 The Committee noted and recommended that the N. C. L. be requested to continue the work on cotton linters.	23.2 p.99-101 The Board noted and endorsed the recommendation of its Committee.
23.3 p.101 The Committee recommended that Dr. Nanjundayya be requested to put up a specific proposal for research on alkali and water soluble cellulose ethers.	23.3 p.101 The Board endorsed the recommendation of its Committee.
24.0 p.101 The Committee noted.	24.0 p.101 The Board noted.
24.1 p.101 The Committee recommended the appointment of a technical assistant to assist the Chairman of the Building Research Committee in his work.	24.1 p.101 The Board endorsed the recommendation of its Committee.

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Item No.	Particulars
	The Committee felt that emphasis should be laid on listing only such of the problems as were of specific interest to the country and constituted a Sub-Committee consisting of Maj. Gen. H. Williams, S. Swarup Singh and Dr. R. K. N. Iyengar, for preparing the statement of research problems. The Chairman said that he would prepare a note on research programme for the Second Five Year Plan, for submission to the Council on receiving suggestions from the members. These suggestions would be discussed by the newly proposed Sub-Committee at a meeting to be held during February 1955. 24.3.1 The Committee noted the progress of work at the Central Building Research Institute and observed that the Institute was now reasonably well equipped but due to lack of adequate staff considerable progress in research had not been made although a good start had been made on many items. A great responsibility rested on this Institute as it was the central organisation. 24.3.2 The Chairman asked members to send him comments on the reports received from the National Building Organisation, National Research Development Corporation & the Experimental Housing Division. 24.3.3 The Chairman requested the members to offer comments on the preliminary report on the work on Comfort Studies in Low-Cost Houses to the technical Committee which was headed by the Director, National Building Organisation.
25	<i>Subject : Symposia under the auspices of the C. S. I. R.</i> <i>Note :</i> 25.0 The following proposals for holding symposia during the year 1955-56 have been received : 25.1 Fuel Research Institute, Jealgora <i>Production and utilisation of slack coal on February 18-19, 1955</i> A symposium on 'Production and utilization of slack coal' was held on February 18-19, 1955 at the Fuel Research Institute, Jealgora. The subjects discussed at the symposium covered: (i) production and marketing, (ii) briquetting, (iii) up-grading, (iv) gasification, (v) combustion and (vi) other industrial uses of slack coal. The proposal is placed before the B. S. I. R. and the Governing Body of the Council for information and approval.

Recommendations of the Committee of the Board	Recommendations of the Board
24.2 p.101-103 The Committee noted that a number of research problems relating to building industry had since been received from the National Building Organisation and other organisations and persons and these had been considered at a meeting of the Sub-Committee of the Research Committee which was preparing a detailed programme for inclusion in the Second Five Year Plan. 24.3.1 p.103 The Committee recommended that the Central Building Research Institute be given adequate staff as provided for in its plan immediately so that the Institute could handle problems which had been referred to it by the National Building Organisation and others. 24.3.2 & 24.3.3 p.103 The Committee recommended that members of the Building Research Committee be requested to forward their comments as desired by the Chairman of the Research Committee.	24.2 p.101-103 The Board noted. 24.3.1 p.103 The Board endorsed the recommendation of its Committee. 24.3.2 & 24.3.3 p.103 The Board endorsed the recommendation of its Committee.
25.1 p.103 The Committee recommended for approval the symposium held at the Fuel Research Institute on 'Production and utilisation of slack coal' in February 1955.	25.1 p.103 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
25.2	Pharmaceuticals and Drugs Research Committee
	<i>Rauwolfia</i>
	The Pharmaceuticals and Drugs Research Committee at its meeting held on February 6, 1954 recommended that a symposium be held on 'Rauwolfia' along with the mid-year meeting of the P & D Research Committee. Dr. B. Mukherji agreed to submit a note on the scope of the symposium.
25.3	Biochemical Research Committee
	<i>Neera</i>
	The Bio-chemical Research Committee at its meeting held on January 3, 1955 recommended holding of a symposium on 'Neera' at the Central Food Technological Research Institute, Mysore, to coincide with the mid-year meeting of the Committee.
25.4	Central Food Technological Research Institute, Mysore
	<i>Status and scope of the biscuit and bakery industries in India</i>
	The industry has, during the past two decades, developed considerably and some of the manufacturing units are in no way inferior to their prototypes in other parts of the world. But the demand for such products has not increased proportionately and also there are many handicaps, technical as well as for raw materials with which these industries are faced. To have a correct appraisal of their requirements thus leading to the various lines of research that can be developed, it is felt necessary to hold a symposium under the auspices of the C. F. T. R. I., Mysore.
25.5	Vegetable Oils Research Committee
	<i>Recent advances in the field of fats and allied products</i>
	The Vegetable Oils Research Committee at its meeting held on January 12, 1955 recommended that a symposium on 'Recent advances in the field of fats and allied products' may be held at Kanpur in October or November, 1955.
25.6	Plastics Research Committee
	<i>High polymers</i>
	The Plastics Research Committee at its meeting held on January 28, 1955 recommended that a symposium on 'High Polymers' may be held preferably at N. C. L., Poona, or at N. P. L., New Delhi, in January, 1956 at the time of the next Indian Science Congress Session to enable foreign delegates

Recommendations of the Committee of the Board	Recommendations of the Board
25.2 p.105 The Committee recommended for approval the proposal to hold a symposium on Rauwolfia by the Pharmaceuticals & Drugs Research Committee.	25.2 p.105 The Board endorsed the recommendation of its Committee.
25.3 p.105 The Committee did not recommend the symposium on 'Neera' as suggested by the Biochemical Research Committee.	25.3 p.105 The Board endorsed the recommendation of its Committee.
25.4 p.105 The Committee recommended that the proposal to hold a symposium on biscuit and bakery industries in India at the Central Food Technological Research Institute, Mysore, be approved. The Committee however recommended the title of the symposium to be altered to 'Scientific and Technological aspects of the biscuit and bakery industries in India'.	25.4 p.105 The Board endorsed the recommendations of its Committee.
25.5 p.105 The Committee recommended the holding of a symposium on 'Recent advances in the field of fats and allied products' at Kanpur towards the end of 1955. The Committee, however, recommended that the scope of the symposium should be with special reference to scientific and technological research in India.	25.5 p.105 The Board endorsed the recommendations of its Committee.

SYMPOSIA

Item No.	Particulars
	attending the Congress to participate in the symposium. At least two of the following leading scientists may be invited to participate (in order of preference) : (a) Dr. H. Staudinger, (b) Dr. H. Mark, (c) Dr. H. W. Melville, (d) Dr. R. Houwink, (e) Dr. G. V. Schulz, (f) Dr. A. Katchalsky. If Dr. Mark is unable to come, Dr. P. J. Flory be invited. 25.7.0 Central Leather Research Institute, Madras 25.7.1 Tanning agents In the modern tanning industry a number of substances are used for tanning. These are called 'Tanning Agents'. The tanning agents used have given rise to different commercial tanning processes each of which produces certain types of leather having specific properties. In the proposed symposium the various groups of tanning agents will be discussed as regards (i) their sources of supply, (ii) the manner of their collection if they are natural products, (iii) methods of manufacture of such tanning agents as are manufactured materials, (iv) methods of testing and analysis of the tanning agents of different groups, (v) the tanning properties of different tanning agents, and (vi) types of leather made by different tanning agents, etc. Tanning agents to be discussed at the symposium have been grouped under the following : (i) vegetable, (ii) mineral, (iii) aldehydes, (iv) polymers, (v) and other tanning agents. 25.7.2 East Indian tanning industry With the object of focussing attention on the present state of the East Indian Tanning Industry and trade, and discussing ways and means of further developing the same along modern lines for greater economic benefit, the Central Leather Research Institute has proposed to hold a symposium on "East Indian tanning industry" some time in 1955. The subjects to be discussed at the symposium are under the following heads: (i) raw materials, (ii) techniques of manufacture of East India tanned kips and skins, (iii) marketing, (iv) adulterations and suggestions for its prevention, (v) standards for E. I. leathers and (vi) further development. 25.8 Cellulose Research Committee Cellulose research While specific problems on cellulose research were dependent largely on the interest of the individuals and the institutions taking up this kind of work, it was agreed that certain problems of immediate interest, both of fundamental and applied nature which are important for the development of cellulose industries, could be fruitfully brought

Recommendations of the Committee of the Board	Recommendations of the Board
25.6 p.105-107 The Committee recommended the holding of a symposium on 'High polymers' immediately after the session of the Indian Science Congress in January 1956. Since the Science Congress Session would be held at Agra, the Committee recommended that the symposium may be held at the National Physical Laboratory, New Delhi to enable scientists to attend the symposium in large numbers. It was also recommended that the Ministry of Natural Resources and Scientific Research and the Indian Science Congress Association be requested to include at least 2 high polymer scientists of international repute in the foreign delegation to the next Indian Science Congress. They may also be invited to take part in the proposed symposium. 25.7 p. 107 The Committee recommended that the proposal to hold a symposium at the Central Leather Research Institute be approved. The Committee considered that the subjects (i) Tanning agents and (ii) East Indian tanning industry could both be dealt with in sessions of one symposium.	25.6 p.105-107 The Board endorsed the recommendations of its Committee. 25.7 p.107 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
	out at a symposium which may be held under the auspices of the C. S. I. R. at a suitable place in India, preferably either at Bombay or Calcutta, towards the end of 1955 along with the next meeting of the Cellulose Research Committee. 25.9 Central Laboratories for Scientific and Industrial Research, Hyderabad <i>Utilization of results of research</i> The Director, Central Laboratories, Hyderabad, has proposed that a symposium on the practical utilization of research may be held under the auspices of the C. S. I. R. at the Central Laboratories, Hyderabad, some time in August, 1955. A symposium on this subject was held at the National Chemical Laboratory in March, 1951. Scientific research in India, particularly in the National Laboratories, has made much progress since then and the question of utilizing the results of research has become an important and pressing question. A second symposium on this subject would, therefore, be of great interest and value. The Director, National Chemical Laboratory, to whom the proposal was referred, while agreeing with the suggestion of the Director, Central Laboratories, has observed that, since the major centres of applied research in the country are the National Laboratories and the topic of the proposed symposium is of special interest to them, the Council should consider sponsoring this symposium at one of the National Laboratories as a sequel to the previous symposium held at the NCL. He has suggested that the symposium should be held at a centrally situated location so that people from all parts of the country may find it convenient to participate. He has proposed the National Physical Laboratory as the venue; if it is not possible to hold the symposium at the N. P. L., he has suggested it may be held at the Central Laboratories, Hyderabad.
26	Subject: The design and construction of an analogue computer for X-ray crystal structure analysis—Dr. R. S. Krishnan, Head of the Dept. of Physics, Indian Institute of Science, Bangalore. Aim & scope: The object of the scheme is to design and construct a simple and moderately priced analogue computer for the summation of double Fourier series met with in X-ray crystal structure analysis problems to accommodate H, K indices ranging ± 25.

Recommendations of the Committee of the Board	Recommendations of the Board
25.8 p.107-109 The Committee noted that but for a few isolated examples, research on cellulose and cellulosic materials had not made much progress in India. It was considered that the subject may not be suitable for holding a scientific symposium at the present stage. However, a small conference of research workers interested in the subject could be convened in order to give fillip to cellulose research in India. The Committee recommended that the DSIR be authorised to examine the question in detail and take appropriate action departmentally. 25.9 p.109 The Committee was impressed by the need for an organised discussion on the subject of 'Utilisation of results of research carried out in India'. The Committee was of the opinion that such a discussion should be held under the auspices of the C. S. I. R. and representatives of industry both from private and public sectors, the concerned organisations of the Government, the National Research Development Corporation and scientists should be invited. The Committee recommended that the DSIR may examine the question further in all its aspects and take departmental action to hold the symposium. It was recommended that a suitable Sub-Committee consisting of the DSIR, one representative of the N. R. D. C., one of the Federation of the Indian Chambers of Commerce and Industry and the Government of India be constituted for this purpose.	25.8 p.107-109 The Board endorsed the recommendation of its Committee. 25.9 p.109 The Board endorsed the recommendations of its Committee.

RESEARCH SCHEMES

Item No.	Particulars																		
	The programme of work will comprise : (i) Construction of a Fourier synthesiser in the first instance of H, K indices ranging ± 10 with provision to extend to ± 25. (ii) Experimental studies of crystal structures of minerals etc., on the completed machine. (iii) Preliminary experimental studies on the parallel problem of computing structure factors. On the principle of synchronous magnetic recorder evolved by Dr. G. Suryanarayanan it is possible to design a machine for Fourier summation at a moderate cost. <i>Author's record :</i> The author has already completed a prototype computer for Fourier synthesis involving 25 terms (5x5) with provision for the results to be presented on the face of a cathode ray oscillograph as a contour map and has gained sufficient experience for the design and construction of a larger machine. <i>Collaboration :</i> Collaboration with Dr. R. V. C. Sundara Rao who has worked on X-ray crystal structure analysis at Pennysylvania State University and Dr. G. Suryanarayanan who has contributed to the basic design of the proposed computer will be available. <i>Duration :</i> The scheme will take a minimum of three years. <i>Grant asked for :</i> <table><tr><td>Equipment :</td><td>...</td><td>Rs. 20,000</td></tr><tr><td>(Special type of cathode-ray oscillographic recorder, electronic and electrical component parts like transformers, tubes, magnetic recording devices, selsyns, synchronous motors, precision resistances, etc.)</td><td></td><td></td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 3,000</td></tr><tr><td>Staff : (Two J.R.A.s)</td><td>...</td><td>Rs. 5,390 (including allowances)</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td>Total</td><td>Rs. 28,390 (including allowances)</td></tr></table>	Equipment :	...	Rs. 20,000	(Special type of cathode-ray oscillographic recorder, electronic and electrical component parts like transformers, tubes, magnetic recording devices, selsyns, synchronous motors, precision resistances, etc.)			Contingencies	...	Rs. 3,000	Staff : (Two J.R.A.s)	...	Rs. 5,390 (including allowances)					Total	Rs. 28,390 (including allowances)
Equipment :	...	Rs. 20,000																	
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	Total	Rs. 28,390 (including allowances)																	

Recommendations of the Committee of the Board	Recommendations of the Board

RESEARCH SCHEMES

Item No.	Particulars
27	<i>Research Committee's recommendation :</i> The Physical Research Committee at its meeting held on February 3, 1955 recommended the scheme for sanction with the grant asked for by the investigator.
	<i>Subject :</i> Investigation in combustion and absorption spectra of various substances—Dr. Devendra Sharma, Lecturer in Physics, University of Allahabad. <i>Aim & scope :</i> The aim of the proposed scheme is to carry out studies in combustion and absorption spectra of various substances. A spectro-photometer will be constructed for measuring spectral intensities. The proposed investigation is expected to throw more light on the processes and products of combustion and may lead to determination of molecular structure. These studies may find application in determining the purity of substances like mustard oil and ghee and detection of the undesirable and injurious adulterants. In India combustion spectra of BrO and IO bands in ethyl bromide and methyl iodide flames, CHO bands in hydrocarbon flames, CCl bands in flames containing methyl chloride, chloroform or carbon tetrachloride and bands of CH, NH₂ etc. have been investigated. Absorption spectra of a number of diatomic and polyatomic molecules mostly in the visible and near ultraviolet regions has also been investigated. Some work has also been done in other countries but the knowledge of the process of combustion is far from complete and there is sufficient scope for investigation in the field of absorption spectra. <i>Author's record :</i> Dr. Sharma has investigated absorption spectra for a number of molecules. <i>Duration :</i> The scheme may take two years for completion.

Recommendations of the Committee of the Board	Recommendations of the Board
26 p.109-113 The Committee recommended the research scheme on 'The design and construction of an analogue computer for X-ray crystal structure analysis' by Dr. R. S. Krishnan for approval and sanction of the following grant : Equipment : Rs. 20,000 Contingencies : Rs. 2,000 Staff : Rs. 5,880 (including allowances) (2 JRAs). Total : Rs. 27,880 " "	26 p.109-113 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
28	<i>Grant asked for :</i>
	Equipment : ... Rs. 1,500 (Construction of spectro-photometer components).
	Contingencies ... Rs. 500
	Staff : (1 J. R. A. ... Rs. 3,927 (including allowances) 1 Mechanic on Rs. 80/- p.m.)
	Total Rs. 5,927 (including allowances)
	<i>Research Committee's recommendation :</i>
	The Physical Research Committee considered the scheme at its meeting held on February 3, 1955 and recommended the scheme with the following grant, but it felt that the investigator be advised to confine his work only to a few typical molecules :
	Equipment ... Rs. 1,500
	Contingencies ... Rs. 500
	Staff Nil
	Total Rs. 2,000
28	<i>Subject :</i> Transition probabilities in the spectra of some astral molecules—Dr. N. R. Tawde, Head of the Department of Physics, Karnatak University, Dharwar.
	<i>Aim & scope :</i>
	The aim of the proposed scheme is to obtain precise quantitative data on the transition probabilities of some selected molecules (TiO, ZrO, LaO, YO, BO, CrO, MgH, NH, OH etc.) occurring in astral sources.
	The aspects proposed to be studied include effect of mass asymmetry, electrical anharmonicity etc.
28	The experimental observations can be used to examine the basic concepts of different theories of transition probabilities.

Recommendations of the Committee of the Board	Recommendations of the Board
7 p.113-115 The Committee recommended the research scheme on 'Combustion and absorption spectra of various substances' by D. Devendra Sharma for sanction of the following grants : Equipment : Rs. 1,500 Contingencies : Rs. 500 Staff : Nil Total : Rs. 2,000	27 p.113-115 The Board endorsed the recommendation of its Committee.

Item No.	Particulars								
	Accurate data on the intensity distribution of derivatives of the transition probabilities has so far been obtained only for a few symmetrical molecules C_2, N_2, CN. <i>Author's record :</i> The author has worked out accurate data on C_2, N_2, CN, AlO and BeO. Author's data on C_2, CN has been used in astronomical observations for temperature determination of late R-type stars. <i>Collaboration :</i> Dr. G. K. Mehta, Reader in Physics will collaborate. <i>Duration :</i> About two years will be required in the first instance but extension for another year may be necessary. <i>Grant asked for :</i> <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>... Rs. 1,200</td></tr> <tr> <td>Staff : (one S.S.A.)</td><td>... Rs. 3,465 (including allowances)</td></tr> <tr> <td></td><td><u>Total Rs. 4,665 (including allowances)</u></td></tr> </table> <i>Research Committee's recommendation :</i> The Physical Research Committee at its meeting held on February 3, 1955 considered the scheme and recommended it for sanction with Rs. 1200/- for contingencies and a J. R. A. If a suitably qualified candidate is not available, S. R. A. may be appointed.	Equipment	Nil	Contingencies	... Rs. 1,200	Staff : (one S.S.A.)	... Rs. 3,465 (including allowances)		<u>Total Rs. 4,665 (including allowances)</u>
Equipment	Nil								
Contingencies	... Rs. 1,200								
Staff : (one S.S.A.)	... Rs. 3,465 (including allowances)								
	<u>Total Rs. 4,665 (including allowances)</u>								
29	Subject : Studies on the electrochemical etching of metal and alloy crystals by the multiple beam interferometry and other recent optical techniques—Dr. P. G. Deo, Lecturer in Physics, University of Lucknow, Lucknow. <i>Aim and scope :</i> The proposed investigation aims at making a comparative study of electrochemical etching of polymetal crystals from areas of different grain orientations and from grain boundaries by employing the multiple beam interferometry and other optical techniques. The investigations can be extended with greater advantage to the industrially important alloys (babbitt and bronze) where preferential etching of components can also be studied.								

Recommendations of the Committee of the Board	Recommendations of the Board								
28 p.115-117 The Committee recommended approval of the research scheme on 'Spectra of astral molecules' by Dr. N. R. Tawde and sanction of the following grant : <table> <tr> <td>Equipment :</td><td>Nil</td></tr> <tr> <td>Contingencies :</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (1 JRA).</td><td>Rs. 2,640 (including allowances)</td></tr> <tr> <td></td><td><u>Total : Rs. 3,640 " "</u></td></tr> </table> It was also recommended that if a suitable candidate was not available for appointment as J. R. A. a S. R. A. may be appointed.	Equipment :	Nil	Contingencies :	Rs. 1,000	Staff : (1 JRA).	Rs. 2,640 (including allowances)		<u>Total : Rs. 3,640 " "</u>	28 p.115-117 The Board endorsed the recommendations of its Committee.
Equipment :	Nil								
Contingencies :	Rs. 1,000								
Staff : (1 JRA).	Rs. 2,640 (including allowances)								
	<u>Total : Rs. 3,640 " "</u>								

Item No.	Particulars
30	<i>Author's record :</i> The author has worked in Prof. S. Tolansky's Laboratory at the London University on the preferential etching of the alloy (babbitt) components by cathodic sputtering. The grain and sub-grain boundaries were observed and precision measurements were made of hillocks and depressions produced by etching. In metals, grains with different orientations were found to sputter differentially.
	<i>Collaboration :</i> The author will have the help of Prof. S. Tolansky in technical matters.
	<i>Duration :</i> The investigation would normally take two years.
	<i>Grant asked for :</i>
	Equipment :
	(I Evaporating silvering unit) ... Rs. 5,000
	Contingencies ... Rs. 500
	Staff : (1 J. R. A.) ... Rs. 2,695 (including allowances)
	Total ... Rs. 8,195 (including allowances)
	<i>Research Committee's recommendation :</i> The Physical Research Committee at its meeting held on February 3, 1955 recommended the following grant :
	Equipment ... Rs. 5,000
	Contingencies ... Rs. 500
	Staff ... Nil
	Total ... Rs. 5,500
	<i>Subject : Properties of capillary held liquids—Dr. B. R. Puri, Punjab University, Hoshiarpur.</i>
	<i>Aim and scope :</i> The object of this scheme is to carry out a study of the physical properties of capillary condensates with a view to understanding the nature of the state of capillary held liquids and the mechanism of adsorption.

Recommendations of the Committee of the Board	Recommendations of the Board
29 p.117-119 The Committee recommended sanction of the research scheme on 'Electrochemical etching of metal and alloy crystals by multiple beam interferometry etc.' by Dr. P. G. Deo, with the following grant in aid :- Equipment : Rs. 5,000 Contingencies : Rs. 500 Staff : Nil Total : Rs. 5,500	29 p.117-119 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
31	<i>Duration :</i> The scheme will take two years for completion.
	<i>Grant asked for :</i>
	Equipment ... Nil
	Contingencies ... Rs. 300
	Staff : (1 J. R. A., 1 Lab. Bearer) ... Rs. 3,295 (including allowances)
	Total ... Rs. 3,595 (including allowances)
	<i>Research Committee's recommendation :</i>
	The Chemical Research Committee had recommended the scheme for a grant. The Physical Research Committee at its meeting held on February 3, 1955 agreed with the recommendation of the Chemical Research Committee and recommended the following grant :
	Equipment ... Nil
	Contingencies ... Rs. 300
	Staff : (1 J. R. A.) ... Rs. 2,420 (including allowances)
	Total ... Rs. 2,720 (including allowances)
	<i>Subject : Study of night air-glow—Dr. K. R. Ramanathan, Director, Physical Research Laboratory, Ahmedabad.</i>
	<i>Aim & scope :</i>
	The object of the scheme is to study the variations of the intensity of night air-glow at different zenith distances so as to determine the approximate heights of the emission layers, and to study the changes of intensity of any or all of these wave lengths with changes in magnetic, auroral and ionospheric disturbances.
	The study of night air-glow in the tropics and sub-tropics is considered to be an important part of the programme of co-ordinated world-wide study of atmospheric phenomena during the International Geophysical Year.
	It is proposed to work first at Mt. Abu where there is an ozone measuring station and extend the work later to a station in the Himalayas.

Recommendations of the Committee of the Board	Recommendations of the Board
30 p.119-121 The Committee recommended that the research scheme on 'Properties of capillary held liquids' by Dr. B. R. Puri be sanctioned with the following grant : Contingencies : Rs. 300 Staff : (1 JRA). Rs. 2,640 (including allowances) Total : Rs. 2,940 " "	30 p. 119-121 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars										
	<i>Author's record :</i> The author and his co-workers have studied the spectrum of light from the night sky at Poona and Kodaikanal. Studies have been made recently at Mt. Abu of the intensity and polarisation of the light from the twilight sky. <i>Duration :</i> The investigation will continue till the end of the International Geophysical Year, 1957-58. <i>Grant asked for :</i> <table><tr><td>Equipment :</td><td>Rs. 6,000</td></tr><tr><td>(Special photo cells, filters, recorders, etc. to be used during the whole period)</td><td></td></tr><tr><td>Contingencies</td><td>Rs. 1,000</td></tr><tr><td>Staff : (1 J. R. A.)</td><td>Rs. 2,940 (including allowances)</td></tr><tr><td>Total</td><td>Rs. 9,940 (including allowances)</td></tr></table> <i>Research Committee's recommendation :</i> The Atmospheric Research Committee in its meeting held on January 17, 1955 recommended the scheme as photometric study of the light from night sky in defined regions of the spectrum formed part of the programme of work for the International Geophysical Year.	Equipment :	Rs. 6,000	(Special photo cells, filters, recorders, etc. to be used during the whole period)		Contingencies	Rs. 1,000	Staff : (1 J. R. A.)	Rs. 2,940 (including allowances)	Total	Rs. 9,940 (including allowances)
Equipment :	Rs. 6,000										
(Special photo cells, filters, recorders, etc. to be used during the whole period)											
Contingencies	Rs. 1,000										
Staff : (1 J. R. A.)	Rs. 2,940 (including allowances)										
Total	Rs. 9,940 (including allowances)										
32	Subject : Nature and origin of atmospherics—Dr. N. W. Chiplonkar, Head of the Physics Department, University of Poona. <i>Aim and scope :</i> It is proposed to carry out an all round study of atmospherics. At first the study will be restricted to the following characteristics : (i) collection of statistics of X's on different narrow wave bands ; (ii) recording of the wave forms of atmospherics ; and (iii) locating the origins of atmospherics by working simultaneously at two stations at a known distance apart.										

Recommendations of the Committee of the Board	Recommendations of the Board								
31 p.121-123 The Committee recommended sanction of the research scheme on 'Night air-glow' by Dr. K. R. Ramanathan with the following grant : <table> <tr> <td>Equipment :</td><td>Rs. 6,000</td></tr> <tr> <td>Contingencies :</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (1 JRA)</td><td>Rs. 2,940 (including allowances)</td></tr> <tr> <td>Total :</td><td>Rs. 9,940 " "</td></tr> </table> The Committee noted that the work under the scheme will form part of the programme of research during the International Geophysical Year.	Equipment :	Rs. 6,000	Contingencies :	Rs. 1,000	Staff : (1 JRA)	Rs. 2,940 (including allowances)	Total :	Rs. 9,940 " "	31 p. 121-123 The Board noted and endorsed the recommendation of its Committee.
Equipment :	Rs. 6,000								
Contingencies :	Rs. 1,000								
Staff : (1 JRA)	Rs. 2,940 (including allowances)								
Total :	Rs. 9,940 " "								

RESEARCH SCHEMES

Item No.	Particulars
33	<i>Author's record :</i> The author has worked on the wave forms of X's and has published two papers and one review article on 'The Waveforms of Atmospherics' in Endeavour.
	<i>Duration :</i> At least three years.
	<i>Grant asked for :</i>
	Equipment : ... Rs. 8,100 (Multiple pen recorder and accessories, UHF oscillator, output meter Marconi, TF 393 wave meter Marconi, etc.).
	Contingencies ... Rs. 1,000
	Staff : (2 junior stipend holders for 2 years) ... Rs. 7,200
	Total ... Rs. 16,300
	<i>Research Committee's recommendation :</i> The scheme was originally presented to the Atmospheric Research Committee. This Committee felt the scheme should be considered in relation to Dr. Khastgir's work in Banaras and recommended it for consideration by the Radio Research Committee.
	Dr. Chiplonkar's scheme was therefore. considered by the Radio Research Committee at its meeting held on January 19, 1955 and was recommended for sanction.
	The Committee observed that since the scheme forms a part of the programme of the International Geophysical Year, the scheme should be continued till the end of the I. G. Y. (1957-58).
	<i>Subject : Study of wind drafts in E & F layers of the ionosphere—Dr. U. D. Desai, Reader in Electronics, Physical Research Laboratory, Ahmedabad.</i>
	<i>Aim & scope :</i> The object of this scheme is to carry out a systematic study of the wind drifts in E & F layers of the ionosphere by setting up a proper pulsing unit.

Recommendations of the Committee of the Board	Recommendations of the Board
32 p. 123-125 The Committee recommended the research scheme on 'Nature and origin of atmospherics' by Dr. N. W. Chiplonkar for approval with the following grant : Equipment : Rs. 8,000 Contingencies : Rs. 1,000 Staff (1 JRA) : Rs. 2940 (includnig allowances.) Total : Rs. 11,940 " " The Committee noted that the work under the scheme would form a part of the research programme during the International Geophysical Year.	32 p. 123-125 The Board noted and endorsed the recomm- endtion of its Committee.

RESEARCH SCHEMES

Item No.	Particulars								
	A study on winds in the ionosphere has been initiated at Ahmedabad Physical Research Laboratory along with the regular recording and analysis of the reflection of electromagnetic waves from the ionosphere. Preliminary experiments have indicated the need for proper aerial system with phasing to eliminate effect of polarisation. The setting up of the unit is expected to yield valuable information regarding tidal and storm type movements in the upper atmosphere. <i>Duration :</i> The scheme is proposed to continue at least till the end of the International Geophysical Year (1957-58). <i>Grant asked for:</i> <table> <tr> <td>Equipment (Cathode ray oscellograph, multiplier etc.)</td><td>... Rs. 2,500</td></tr> <tr> <td>Contingencies</td><td>... Rs. 1,500</td></tr> <tr> <td>Staff : (One J.R.A.)</td><td>... Rs. 2,695 (including allowances)</td></tr> <tr> <td></td><td><u>Total Rs. 6,695 (including allowances)</u></td></tr> </table> <i>Research Committee's recommendation :</i> The Radio Research Committee at its meeting held on January 19, 1955 recommended the scheme with the grant asked for by investigator. Since the scheme forms part of the programme for the International Geophysical Year (1957-58), the Committee has recommended that the investigation should be continued till the end of the I. G. Y.	Equipment (Cathode ray oscellograph, multiplier etc.)	... Rs. 2,500	Contingencies	... Rs. 1,500	Staff : (One J.R.A.)	... Rs. 2,695 (including allowances)		<u>Total Rs. 6,695 (including allowances)</u>
Equipment (Cathode ray oscellograph, multiplier etc.)	... Rs. 2,500								
Contingencies	... Rs. 1,500								
Staff : (One J.R.A.)	... Rs. 2,695 (including allowances)								
	<u>Total Rs. 6,695 (including allowances)</u>								
34	Subject : The study of winds in the ionosphere—Dr. S. R. Khastgir, Department of Physics, B. H. U, Banaras. <i>Aim & scope :</i> The proposed scheme is for carrying out a detailed study of the winds in the E and F₂ regions of the ionosphere with special reference to the measurement of their velocity components in the horizontal and vertical directions during the hours of day and night in different seasons and magnetically active days.								

Recommendations of the Committee of the Board	Recommendations of the Board								
33 p.125-127 The Committee recommended that the research scheme on 'Wind drafts in the ionosphere' by Dr. U. D. Desai be approved and the following grant be sanctioned : <table> <tr> <td>Equipment :</td><td>Rs. 2,500</td></tr> <tr> <td>Contingencies :</td><td>Rs. 1,000</td></tr> <tr> <td>Staff (1 JRA) :</td><td>Rs. 2,940 (including allowances)</td></tr> <tr> <td><u>Total :</u></td><td><u>Rs. 6,440</u> " "</td></tr> </table> The Committee noted that the work under the scheme would form a part of the programme of work during the International Geophysical Year.	Equipment :	Rs. 2,500	Contingencies :	Rs. 1,000	Staff (1 JRA) :	Rs. 2,940 (including allowances)	<u>Total :</u>	<u>Rs. 6,440</u> " "	33 p. 125-127 The Board noted and endorsed the recommendation of its Committee.
Equipment :	Rs. 2,500								
Contingencies :	Rs. 1,000								
Staff (1 JRA) :	Rs. 2,940 (including allowances)								
<u>Total :</u>	<u>Rs. 6,440</u> " "								

Item No.	Particulars															
	The investigation will be conducted according to the following programme : (i) Measurement of the horizontal velocity component of the ionospheric winds by the method of spaced receivers (method of Ratcliffe & Mitra). (ii) Measurements of the vertical velocity component of the ionospheric winds from the observations of quasi-frequency of the periodic fading of the Doppler-beat type (method of Khastgir & Das). (iii) Measurement of short and medium radio waves. (iv) Measurements in different hours of the day and night, in different season and on magnetically active days. (v) Analysis of the experimental results on the velocities of the ionospheric winds. The investigation may lead to valuable information concerning the behaviour of the ionospheric region. <i>Author's record :</i> Dr. Khastgir <i>et al</i> have carried out an estimate of the vertical component of the ionospheric winds from study of periodic fading of short and medium wave radio signals. The work has indicated evidence of the dependence of vertical velocity components, on tidal oscillations and passage of meteorites through the ionosphere. The scheme is in continuation of these investigations. <i>Duration :</i> The scheme is to cover a period of at least two years. <i>Grant asked for :</i> <table><tr><td>Equipment :</td><td>...</td><td>Rs. 5,000</td></tr><tr><td colspan="3">(Two sets of spaced aerial systems, recording systems etc).</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 600</td></tr><tr><td>Staff : (1 J. R. A.)</td><td>...</td><td>Rs. 2,420 (including allowances)</td></tr><tr><td colspan="2">Total Rs. 8,020</td><td>(including allowances)</td></tr></table>	Equipment :	...	Rs. 5,000	(Two sets of spaced aerial systems, recording systems etc).			Contingencies	...	Rs. 600	Staff : (1 J. R. A.)	...	Rs. 2,420 (including allowances)	Total Rs. 8,020		(including allowances)
Equipment :	...	Rs. 5,000														
(Two sets of spaced aerial systems, recording systems etc).																
Contingencies	...	Rs. 600														
Staff : (1 J. R. A.)	...	Rs. 2,420 (including allowances)														
Total Rs. 8,020		(including allowances)														

Recommendations of the Committee of the Board	Recommendations of the Board

RESEARCH SCHEMES

Item No.	Particulars
35	<i>Research Committee's recommendation :</i>
	The Radio Research Committee at its meeting held on January, 19, 1955 recommended the scheme with the grant asked for by the investigator.
	The Committee noted that this subject will form part of the programme for the International Geophysical Year (1957-58).
	<i>Subject :</i> Pulsive tube characteristic meter—Prof. R. Filipowsky, Head of the Electronics Faculty, Madras Institutes of Technology, Madras.
	<i>Aim & scope :</i>
	The object of the proposed scheme is to develop and construct a prototype electronic measuring set for measuring the characteristics of electron tubes in 'forbidden ranges' where permanent operation would damage the tubes. Normal tolerable operating conditions of tubes could also be measured.
	<i>Author's record :</i>
	The author has carried out preliminary work on development of a millimicro second pulse generator under the C. S. I. R. scheme and some experience has been gained in solving the switching problem. But to secure accuracy of operation in all required ranges, further work is necessary.
	Prof. Filipowsky developed a similar instrument during the war but it was for oscillographic measurement of low accuracy only.
	The apparatus proposed to be developed will find application in tube and circuit designing and in pulse and transmitting techniques.
<i>Duration :</i> The scheme will take one year for completion	
<i>Grant asked for :</i>	
	Equipment : ... Rs. 5,800
	(Material for prototype construction and investigating alternative arrangements)
	Contingencies ... Rs. 1,500
	Staff : (One J. R. A., two Mechanics) ... Rs. 5,445 (including allowances)
	Total Rs. 12,745 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board								
34 p.127-131 The Committee recommended that the research scheme on 'Winds in the Ionosphere' by Dr. S. R. Khastgir be approved with the following grant in aid : <table> <tr> <td>Equipment :</td><td>Rs. 5,000</td></tr> <tr> <td>Contingencies :</td><td>Rs. 600</td></tr> <tr> <td>Staff (1 JRA) :</td><td>Rs. 2,640 (including allowances)</td></tr> <tr> <td>Total :</td><td>R. 8,240 " "</td></tr> </table> The Committee noted that the work under the scheme would form a part of the programme during the International Geophysical Year.	Equipment :	Rs. 5,000	Contingencies :	Rs. 600	Staff (1 JRA) :	Rs. 2,640 (including allowances)	Total :	R. 8,240 " "	34 p. 127-131 The Board noted and endorsed the recommendation of its Committee.
Equipment :	Rs. 5,000								
Contingencies :	Rs. 600								
Staff (1 JRA) :	Rs. 2,640 (including allowances)								
Total :	R. 8,240 " "								

RESEARCH SCHEMES

Item No.	Particulars											
36	<i>Research Committee's recommendation :</i> The Radio Research Committee at its meeting held on January 19, 1955 recommended the scheme with the grant asked for by the investigator.											
	<i>Subject :</i> Measurements of dielectric constants at microwave frequencies— Mr. P. V. Indiresan, Lecturer in Electrical Communication Engineering, University of Roorkee.											
	<i>Aim and scope :</i> The investigator proposes to take up three methods of measuring dielectric constants. They are (i) transmission in a wave guide, (ii) short circuited line method, (iii) resonant cavity method. The aim of the project is to correlate the results obtained by three simple but independent methods and hence obtain a consistency and reliability possible only with much complicated procedure. Their practical use will mainly be in testing of samples of materials to be used in microwave equipment. The experiments will be carried out only on the X band. The investigator intends to use 2K39 or 2K25 (Klystrons) for this investigation.											
	<i>Duration :</i> The investigation will take two years.											
	<i>Grant asked for :</i> <table> <tr> <td>Equipment : ...</td><td>Rs. 7,000</td></tr> <tr> <td>(Low noise intensity modulated special purpose oscillograph to be constructed, two Klystron tubes and special precision tools)</td><td></td></tr> <tr> <td>Contingencies ...</td><td>Rs. 5,000</td></tr> <tr> <td>Staff: (1 J. R. A.) ...</td><td>Rs. 2,420 (including allowances)</td></tr> <tr> <td><i>Research Committee's recommendation :</i></td><td></td></tr> <tr> <td>Total</td><td>Rs. 14,420 (including allowances)</td></tr> </table>	Equipment : ...	Rs. 7,000	(Low noise intensity modulated special purpose oscillograph to be constructed, two Klystron tubes and special precision tools)		Contingencies ...	Rs. 5,000	Staff: (1 J. R. A.) ...	Rs. 2,420 (including allowances)	<i>Research Committee's recommendation :</i>		Total
Equipment : ...	Rs. 7,000											
(Low noise intensity modulated special purpose oscillograph to be constructed, two Klystron tubes and special precision tools)												
Contingencies ...	Rs. 5,000											
Staff: (1 J. R. A.) ...	Rs. 2,420 (including allowances)											
<i>Research Committee's recommendation :</i>												
Total	Rs. 14,420 (including allowances)											
	The Radio Research Committee at its meeting held on January 19, 1955 recommended the scheme. The grants for the equipment, contingencies and staff will be decided by the Chairman in consultation with the investigator.											

Recommendations of the Committee of the Board	Recommendations of the Board
35 p.131-133 The Committee noted that Prof. Filipowsky would be out of India upto the end of August 1955. The Committee while approving of the scheme in principle recommended that the DSIR may ascertain from the Madras Institute of Technology if there was any other scientist who could handle this work in the absence of Prof. Filipowsky and then sanction necessary funds.	35. p. 131-133 The Board noted and endorsed the recommendation of its Committee.
36 p. 133 The Committee recommended that the research scheme on 'Dielectric constants at microwave frequencies' by Mr. P.V. Indiresan be approved. It was further recommended that the DSIR be authorised to sanction necessary grant for the scheme in consultation with the Chairman of the Research Committee.	36 p. 133 The Board endorsed the recommendations of its Committee.

RESEARCH SCHEMES

Item No.	Particulars								
37	Subject : Study of the ionosphere with particular reference to the special features observed in the Indian latitudes—Dr. S. S. Banerjee, Banaras Hindu University Banaras. Aim & scope : The object of this scheme is to design and develop a suitable apparatus and with it carry out systematic and detailed studies of the irregularities in the characteristics of the F₂ region of the ionosphere responsible for short wave radio communication for long distances in the Indian latitudes. The problems proposed to be investigated are : (i) Design and development of simple equipment for ionosphere investigations. (ii) Study of the diurnal and seasonal variations of the thickness and conductivity of the ionosphere with special reference to the scattering of radio waves. (iii) Study of the diurnal and seasonal variation of the horizontal gradient of ionisation in the ionosphere. (iv) Study of the angle of arrival of the downcoming radio waves from the ionosphere and their bearing on the long distance scattering of radio waves. Author's record : The author has worked on scattering of radio waves and estimated the horizontal gradient of ionisation in the ionosphere and also designed and constructed equipment for ionospheric observations. Duration : The scheme is expected to take three years. Grant asked for : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 700</td></tr> <tr> <td>Staff: (1 S. R. A. & 1 J. R. A.)</td><td>Rs. 5,885 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 6,585 (including allowances)</td></tr> </table> Research Committee's recommendation : The Radio Research Committee at its meeting held on January 19, 1955 considered the scheme and observed that although the title suggested that it was a new scheme,	Equipment	Nil	Contingencies	Rs. 700	Staff: (1 S. R. A. & 1 J. R. A.)	Rs. 5,885 (including allowances)	Total	Rs. 6,585 (including allowances)
Equipment	Nil								
Contingencies	Rs. 700								
Staff: (1 S. R. A. & 1 J. R. A.)	Rs. 5,885 (including allowances)								
Total	Rs. 6,585 (including allowances)								

Recommendations of the Committee of the Board	Recommendations of the Board

RESEARCH SCHEMES

Item No.	Particulars															
	it was really a continuation of the old scheme. The Committee felt that the work of scattering of radio waves was of great importance and that Dr. Bannerjee's earlier scheme 'Scattering of radio waves' be renewed with one more Junior Research Assistant.															
38	Subject : Study of the growth of precipitate particles in the ageing of 24-S aluminium alloy by electron microscope—Dr. D. L. Bhattacharya, Lecturer in Electron Optics, Indian Institute of Science, Bangalore. Aim & scope : The object of the scheme is to study the correlation between the shape and size of precipitation zones of 24-S aluminium alloy with the predictions from theory. The proposed investigation will be on the following lines : (i) Examination of microstructures at different stages of ageing at fixed ageing temperatures (50°C, 100°C, 150°C & 200°C), using electron microscope. (ii) Plotting of hardness-time curves to follow the age-hardening process at these temperatures. 24-S aluminium alloy is widely used specially in aircraft industry. Author's record : The author has carried out a literature survey and worked on development of the oxide-replica technique microscopy. Duration : The scheme will take two years. Grant asked for : <table><tr><td>Equipment :</td><td>...</td><td>Rs. 1,000</td></tr><tr><td>(Thermocouples, relays, 24-S alloys etc.)</td><td></td><td></td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 1,000</td></tr><tr><td>Staff : (One J. R. A.)</td><td>...</td><td>Rs. 2,695 (including allowances)</td></tr><tr><td>Total</td><td>...</td><td>Rs. 4,695 (including allowances)</td></tr></table> Research Committee's recommendation : The scheme was considered by the Metals Research Committee in its meeting held on the 3rd December 1954, and was recommended for sanction.	Equipment :	...	Rs. 1,000	(Thermocouples, relays, 24-S alloys etc.)			Contingencies	...	Rs. 1,000	Staff : (One J. R. A.)	...	Rs. 2,695 (including allowances)	Total	...	Rs. 4,695 (including allowances)
Equipment :	...	Rs. 1,000														
(Thermocouples, relays, 24-S alloys etc.)																
Contingencies	...	Rs. 1,000														
Staff : (One J. R. A.)	...	Rs. 2,695 (including allowances)														
Total	...	Rs. 4,695 (including allowances)														

Recommendations of the Committee of the Board	Recommendations of the Board
37 p.135-137 As suggested by the Radio Research Committee, the Committee recommended the renewal of the research scheme on 'Scattering of radio waves' by Dr. S.S. Banerjee for the year 1955-56. The following grant was recommended : Equipment: Nil Contingencies : Rs. 700 Staff : (IJRA) Rs. 2,922 (including allowances) Total : Rs. 3,622 " "	37 p. 135-137 The Board endorsed the recommendation of its Committee.
38 p.137 The Committee recommended sanction of the research scheme on 'Growth of precipitate particles in the ageing of 24-S aluminium alloy by electron microscope' by Dr.D.L. Bhattacharya with the following grant : Equipment : Rs. 1,000 Contingencies : Rs. 1,000 Staff : (I JRA) Rs. 2,940 (including allowances) Total : Rs. 4,940	38 p. 137 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars												
39	Subject : Corrosion inhibitive action of pigments—Dr. S. C. Shome, Professor of Chemistry, Presidency College, Calcutta. Aim & scope : The object of the proposed scheme is to carry out a systematic investigation of the inhibitory properties of various pigments individually or in mixed state with particular reference to the part played by mechanical exclusion of corrosion influences of water, oxygen etc, and chemical passivation of the metallic surface in the protection of the underlying metal by paints. Visual examination and potential measurements will be used to assess the rate of corrosion of submerged metal. Quantitative method will be used for determining the amount of metal in the corrosion products and microscopic examination of the paint films to study their physical nature. Corrosion inhibitors are of three types, anodic, cathodic and adsorption inhibitors. The action of soluble inhibitors of metallic corrosion, the specific inhibitive nature of some pigments on steel and the influence of physical and chemical properties of pigments on sub-corrosive paint films have been investigated by several foreign investigators, but the scientific basis of protection of paints has not been fully explained.. A knowledge of the protective action of mixed pigments and new compounds is important for preparation of anti-corrossive coatings and marine paints and will be of interest to the navy. Author's record : The author has carried out preliminary investigation on the inhibitive action of litharge and red pigments in linseed oil. A mixture of litharge and red lead was observed to protect the submerged steel more effectively than red lead alone. Grant asked for : <table><tr><td>Equipment</td><td>...</td><td>Nil</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 2000</td></tr><tr><td>Staff : (One S. S. A. and one Lab. Assistant)</td><td>...</td><td>Rs. 2,492 (including allowances)</td></tr><tr><td></td><td>Total</td><td>Rs. 4,492 (including allowances)</td></tr></table>	Equipment	...	Nil	Contingencies	...	Rs. 2000	Staff : (One S. S. A. and one Lab. Assistant)	...	Rs. 2,492 (including allowances)		Total	Rs. 4,492 (including allowances)
Equipment	...	Nil											
Contingencies	...	Rs. 2000											
Staff : (One S. S. A. and one Lab. Assistant)	...	Rs. 2,492 (including allowances)											
	Total	Rs. 4,492 (including allowances)											

Recommendations of the Committee of the Board	Recommendations of the Board

RESEARCH SCHEMES

Item No.	Particulars
40	<i>Research Committee's recommendation :</i> The Metals Research Committee in its meeting held on the 3rd December 1954 considered the scheme and recommended it for sanction as the subject was of considerable importance and Dr. Shome was well qualified to take up the investigation.
	Subject : Pressure leaching of copper ores and reduction of the leach solution with a reducing gas to produce copper metal—Dr. T. K. Roy, Prof. of Chemical Engineering, College of Engineering and Technology, Calcutta. <i>Aim & scope :</i> The object of this scheme is to develop a novel hydrometallurgical method for production of copper metal (equivalent to the thermally refined metal) from low grade sulphide ores ; the following are the steps involved : (a) solubilization of copper as copper sulphate by subjecting a water slurry of the ore or the concentrate to the oxidizing action of compressed air at 250-500°F. According to solubility data the bulk of the impurities, such as iron, arsenic, silica, aluminium, calcium etc., will stay out of solution under these conditions and the resulting copper sulphate solution can be purified easily. (b) reduction of the purified solution with compressed sulphur dioxide to precipitate copper powder. The programme of work will comprise of a study of the kinetics and mechanism of the oxidation leaching step and the reduction step in respect of the following variables : (a) particle size of the concentrate, (b) partial pressure of oxygen, (c) temperature, (d) agitation, (e) slurry density, (f) initial and final pH. Refining of cobalt and nickel by the ammonia leaching process has been investigated but no information is available on the kinetics of acid-oxidation leach of calcopyrites or the reduction of copper sulphate with reducing gases. The proposed process is likely to prove more economical specially for low grade ores or ores containing objectionable impurities (phosphorus, arsenic etc.) than the conventional thermal process. The fuel requirements of the plant will be low due to exothermic nature of the oxidation step and sulphuric acid and sulphur dioxide being the by-products, the cost of chemicals will be eliminated if SO₂ proves to be a satisfactory

Recommendations of the Committee of the Board	Recommendations of the Board
39. p.139-141 The Committee recommended that the research scheme on 'Corrosion inhibitive action of pigments' by Dr. S.C. Shome be approved and the following grant be made : Equipment : Nil Contingencies : Rs. 1,200 Staff: (JRA or SRA according to qualifications) Rs. 3,060 (including allowances) Total : Rs. 4,260 " "	39 p. 139-141 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
	reducing agent. The tailings from the leaching step, mainly consisting of iron oxide, may be sintered for blast furnace feed.
	<i>Author's record :</i>
	The author has established the technical feasibility of the proposed scheme while working on various nickel and cobalt ores as Head of the Metals Section and Development Division of the Chemical Construction Corporation, New York.
	<i>Duration :</i>
	It is expected to complete the scheme in about three years.
	<i>Grant asked for :</i>
	Equipment : ... Rs. 1,500 (Electrically heated roasting furnace, glass lined high pressure reduction tower)
	Contingencies ... Rs. 1,500
	Staff : (One J. R. A. on Rs. 220/-p.m.) ... Rs. 3,547 (including allowances)
	Total ... <u>Ra. 6,547</u> (including allowances)
	<i>Research Committee's recommendation :</i>
	The Metals Research Committee considered the scheme in its meeting held on December 28, 1954.
	The Director, National Metallurgical Laboratory expressed his interest in the investigation. It was also mentioned that no work in this line was in progress at the Indian Copper Corporation Ltd., Ghatsila.
	The Committee recommended the scheme with an initial grant of Rs. 4,500/-.
	<i>Subject :</i> Utilisation of low temperature coal tar—Dr. Husain Zaheer and Dr. M. G. Krishna, Central Laboratories for Scientific & Industrial Research, Hyderabad-Dn.
	<i>Aim & scope :</i>
	The aim of the scheme is to carry out a detailed examination of low temperature carbonisation tar and other products of the carbonisation plant set up at the Central

Recommendations of the Committee of the Board	Recommendations of the Board
40 p. 141-143 The Committee recommended that the research scheme on 'Pressure leaching of copper solution to produce copper' by Dr. T.K. Roy be sanctioned with the following grant : Equipment : Rs. 1,500 Contingencies : Rs. 1,000 Staff : (I JRA) Rs. 3,060 (including allowances) Total : <u>Rs. 5,560</u>	40 p. 141-143 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
	Laboratories, Hyderabad (Dn) and develop readily marketable products, first on laboratory scale and finally on pilot plant scale. The investigation will be carried out according to the following programme :- (i) a detailed chemical examination of the tar to identify, estimate and isolate its different components. (ii) processing of the tar and oil into readily marketable products such as road tar, creosote, disinfectants, plasticizers, briquetting pitch, bituminous paints, roofing felt, electrode carbon etc., (according to Indian Standard Sps.) and to develop methods to improve the products. (iii) pilot plant scale experiments on the basis of the data obtained from the laboratory experiments. The experimental Lurgi low temperature carbonisation plant set up at the Central Laboratories, Hyderabad has recently gone into operation and is producing about 130 gallons of heavy tar and 170 gallons of middle oil per day. The tar oil obtained from trial runs of this experimental plant has been tested and representative samples obtained from Kothagudium and Tandur coals collected and analysed for their physical properties, acid content, distillation characteristics, calorific value, and benzene insolubles. The properties of the pitch obtained have also been determined. The results indicate their suitability for processing into useful products. Since the quantities and composition of the tar produced depend on the type of coal carbonised and the techniques of carbonization, it is necessary to make detailed laboratory and pilot plant studies on the tar and oil collected from the carbonisation plant. <i>Duration :</i> The scheme is for three years in the first instance. <i>Grant asked for :</i> Equipment : Rs. 24,000 (Pilot plant unit for tar acid fractionation, pressure dehydration unit, tar distillation unit, fractionating still for phenols etc., apparatus for determining accelerated weathering of bituminous materials, one penetrometer.)

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars
	Contingencies Rs. 5,000 Staff : 21,437 (including allowances) (2 S. R. As., 2 J. R. As., 2. S. L. As., 2. Lab. Attdts.) Total Rs. 50,437 (including allowances)
	<i>Research Committee's recommendation :</i> The Fuel Research Committee discussed the scheme at its meeting held on December 20, 1954. The Committee was of the opinion that the scheme submitted by Dr. Zaheer should really form part of a much larger programme of work which must be undertaken at Hyderabad in connection with the development of coal of that area. Successful establishment of low temperature carbonisation on a large scale in India would require considerable efforts in research and development in the laboratory and on pilot plant scale. The Committee was aware of the programme of work on these aspects at the National Fuel Research Institute but the programme of work undertaken by the Hyderabad Laboratories must also be pursued to a successful end. The Committee did not recommend the scheme as it stood but recommended that the B. S. I. R. should consider the grant of Rs. 1 lakh per annum for the next five years for financing low temperature carbonisation research at Hyderabad and requested Dr. Zaheer to submit an application stating his complete immediate requirements of plant and the programme of research in this direction. The programme of research should be carried out in consultation with the Fuel Research Institute.
42	<i>Subject :</i> Reaction of calcium carbonate with ammonium chloride solutions at elevated temperatures and production of soda ash using the ammonia and carbon dioxide evolved—Dr. T. K. Roy, Professor of Chemical Engineering, College of Engineering and Technology, Calcutta. <i>Aim & scope :</i> The aim of the scheme is to eliminate the use of lime in the 'Solvay Process' for soda ash manufacture. In the conventional Solvay Process it is necessary to operate a lime kiln requiring a substantial amount of coke. In the proposed scheme,

Recommendations of the Committee of the Board	Recommendations of the Board
41 p. 143-147 The Committee considered the need for a comprehensive programme of research on low temperature carbonisation of coal and utilisation of its products, and recommended that the Fuel Research Committee be requested to draw up such a programme, indicating the part that would be carried out by the Hyderabad Laboratories. The D.S.I.R. may then have the details examined and bring the matter before the B.S.I.R. at the next meeting. The Committee also recommended that the question of giving an annual block grant to the Hyderabad Laboratories for the next five years instead of the present ad-hoc grants on a year to year basis be considered by the CSIR.	41 p. 143-147 The Board considered it important that the Hyderabad Central Laboratories should be helped in every way to function adequately and efficiently in co-ordination with the C.S.I.R. The Board recommended that a Committee consisting of Prof. M.S. Thacker as Chairman, Dr. J.C. Ghosh, Dr. D. S. Kothari, Dr. S. H. Zaheer and a representative of the Hyderabad Government be appointed to consider the whole question and to define the relationship of the Central Laboratories with the C.S.I.R. and to make such other recommendations as may be considered necessary. The Board also recommended that the President may nominate one or two more members on the Committee, if necessary.

RESEARCH SCHEMES

Item No.	Particulars										
	the ammonium chloride solution will be treated directly with powdered limestone at 350-450°C and the ammonium carbonate vapour evolved will be used to precipitate fresh quantities of sodium bicarbonate. Precipitated calcium carbonate sludge such as produced at the Sindri Plant or at soda ash causticizing plants can be used with advantage. Scope of this investigation will include the effect of the following on the rate of reaction and the equilibrium recovery of ammonia: (i) source of calcium carbonate; (ii) particle size of calcium carbonate; (iii) temperature of reaction; (iv) ammonia and CO₂ over pressure; (v) agitation. If the rate of reaction proves to be rapid enough at moderate temperatures and pressures for commercial exploitation, then the optimum method of handling ammonium carbonate produced in a modified solvay process will be investigated. <i>Author's record :</i> The author has worked in the laboratories of the Chemical Construction Corporation of New York on the reaction of ammonium chloride and limestone in a stirred autoclave. It was found that ammonium chloride can be decomposed with limestone within a short period and a gas mixture containing ammonia and carbon dioxide was evolved. <i>Duration :</i> The scheme will take two years to complete. <i>Grant asked for :</i> <table> <tr> <td>Equipment :</td><td>Rs. 2,000</td></tr> <tr> <td>(High pressure tower reactor)</td><td></td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (One S. R. A.)</td><td>Rs. 4,200 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 7,200 (including allowances)</td></tr> </table> <i>Research Committee's recommendation :</i> The Chemical Research Committee at its meeting held on January 3, 1955 considered the scheme. The Director, Geological Survey of India had enquired how the proposed scheme will be more economical than the conventional processes. Firstly, ammonium chloride is more costly than ammonia and secondly the proposed solution is to be heated at 250°C necessitating the use of substantial amount of coal or coke. Again,	Equipment :	Rs. 2,000	(High pressure tower reactor)		Contingencies	Rs. 1,000	Staff : (One S. R. A.)	Rs. 4,200 (including allowances)	Total	Rs. 7,200 (including allowances)
Equipment :	Rs. 2,000										
(High pressure tower reactor)											
Contingencies	Rs. 1,000										
Staff : (One S. R. A.)	Rs. 4,200 (including allowances)										
Total	Rs. 7,200 (including allowances)										

Recommendations of the Committee of the Board	Recommendations of the Board

RESEARCH SCHEMES

Item No.	Particulars
	the reaction is to take place in solution and some pressure had to be applied involving additional cost. Even if the process is successful, it may prove to be more costly than the conventional one. If it is the question of utilization of calcium carbonate sludge at the Sindri Plant, it is better to utilize it for the manufacture of cement than for CO₂ as in the latter case the sludge will reappear as calcium chloride which shall have to be disposed of. Under present conditions coke is possibly the best and the cheapest source of CO₂ in our country. Dr. J. C. Ghosh did not agree with the views of the Director, Geological Survey of India as great deal of research on this problem was in progress in America. In view of the great importance of the soda ash industry, he observed that this work should be supported. The Chairman said that, in dealing with basic chemicals such as soda ash, it is not desirable to rule out a scheme of research on the basis of the anticipated cost of production. After discussion, the Committee recommended the scheme for sanction.
43	Subject : Studies in thiopegan derivatives—Dr. K. S. Narang, Lecturer in Organic Chemistry, Punjab University, Hoshiarpur. Aim & scope : The object of this scheme is to carry out the synthesis of (i) 10 : 11 thiopegan derivatives (ii) 4 : 11 thiopegan derivatives and (iii) 9 : 10 thiopegan derivatives with suitable substituents in various positions including the benzene ring and their unsaturated derivatives. The biological evaluation of the products synthesised will also be done. Author's record : The author is carrying out systematic synthesis of thiopegan derivatives and has isolated some products. The mechanism of the reactions involved is also under investigation. Some of the derivatives synthesised have shown considerable activity in preliminary anti-malarial tests against <i>P. gallinaceum</i> in chicks at the Malaria Institute of India. One compound was found to prevent the growth of <i>Mycobacterium tuberculosis</i> in dilution of 1 : 1000.

Recommendations of the Committee of the Board	Recommendations of the Board								
42 p. 147-151 The Committee recommended that the research scheme on 'The production of soda ash from calcium carbonate and ammonium chloride' by Dr. T.K. Roy be sanctioned with the following grant : <table> <tr> <td>Equipment :</td><td>Rs. 2,000</td></tr> <tr> <td>Contingencies:</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (I SRA)</td><td>Rs. 4,329 (including allowances)</td></tr> <tr> <td>Total :</td><td>Rs. 7,329 " "</td></tr> </table>	Equipment :	Rs. 2,000	Contingencies:	Rs. 1,000	Staff : (I SRA)	Rs. 4,329 (including allowances)	Total :	Rs. 7,329 " "	42 p. 147-151 The Board endorsed the recommendation of its Committee.
Equipment :	Rs. 2,000								
Contingencies:	Rs. 1,000								
Staff : (I SRA)	Rs. 4,329 (including allowances)								
Total :	Rs. 7,329 " "								

RESEARCH SCHEMES

Item No.	Particulars												
	The work will be followed up. <i>Collaboration :</i> Advice of Dr. S. M. Mukherji, Head of the Chemistry Department will be available. Biological testing can be carried out at the Central Drug Research Institute, Lucknow and Malaria Institute of India, Delhi. <i>Duration :</i> The first phase of the work will take not less than five years. <i>Grant asked for :</i> <table> <tr> <td>Equipment :</td><td>Rs. 2,000</td></tr> <tr> <td>(Special glass apparatus)</td><td></td></tr> <tr> <td>Contingencies</td><td>Rs. 5,000</td></tr> <tr> <td>Staff :</td><td>Rs. 7,602 (including allowances)</td></tr> <tr> <td>(One S. R. A., one J. R. A. and one S. L. A.).</td><td></td></tr> <tr> <td>Total</td><td>Rs. 14,602 (including allowances)</td></tr> </table> <i>Research Committee's recommendation :</i> The Chemical Research Committee in its meeting held on the 12th January, 1955 noted that Dr. Narang had already done a great deal of work on the problem and recommended the scheme for sanction. The Pharmaceuticals & Drugs Research Committee in its meeting held on the 6th February, 1955 at Delhi also recommended the scheme.	Equipment :	Rs. 2,000	(Special glass apparatus)		Contingencies	Rs. 5,000	Staff :	Rs. 7,602 (including allowances)	(One S. R. A., one J. R. A. and one S. L. A.).		Total	Rs. 14,602 (including allowances)
Equipment :	Rs. 2,000												
(Special glass apparatus)													
Contingencies	Rs. 5,000												
Staff :	Rs. 7,602 (including allowances)												
(One S. R. A., one J. R. A. and one S. L. A.).													
Total	Rs. 14,602 (including allowances)												
44	<i>Subject :</i> Adrenal steroids and vitamin C in relation to diabetes—Dr. S. Banerjee, Head of the Department of Physiology, Presidency College, Calcutta. <i>Aim & scope :</i> The aim of this scheme is to investigate the inter-relationship of cholesterol metabolism, adrenal cortical activity and vitamin C nutrition in relation to diabetes. Deficiency of vitamin C in the body has been found to alter the metabolism of carbohydrate in the body due to diminished secretion of insulin and disturbed secretions of the adrenal gland. Glucocorticoid of the adrenal cortex is diabetogenic in some species of												

Recommendations of the Committee of the Board	Recommendations of the Board								
43 p. 151-153 The Committee recommended sanction of the research scheme on 'Thiopegan derivatives' by Dr. K.S. Narang with the following grant:— <table> <tr> <td>Equipment</td><td>Rs. 2,000</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,500</td></tr> <tr> <td>Staff : (I SRA Rs. 5,970 (including allowances). and I SLA).</td><td></td></tr> <tr> <td>Total</td><td>Rs. 9,470</td></tr> </table> „ „ The Committee further recommended that the biological evaluation of the promising compounds be carried out at the CSIR centre for screening of antimalarials at the Malaria Institute of India.	Equipment	Rs. 2,000	Contingencies	Rs. 1,500	Staff : (I SRA Rs. 5,970 (including allowances). and I SLA).		Total	Rs. 9,470	43 p. 151-153 The Board endorsed the recommendations of its Committee.
Equipment	Rs. 2,000								
Contingencies	Rs. 1,500								
Staff : (I SRA Rs. 5,970 (including allowances). and I SLA).									
Total	Rs. 9,470								

RESEARCH SCHEMES

Item No.	Particulars								
	animals. Administration of ACTH also induces a hyperglycemia and a fall in the glutathione content of the blood. It also produces a lowering of the cholesterol and vitamin C content of the adrenals. These effects are also produced in vitamin C deficiency. The etiology of diabetes is still unknown. The proposed investigation is expected to indicate a new and rational line of approach in the treatment of diabetes. <i>Author's record :</i> The proposer of the scheme has done some preliminary work on the problem, which has been reported in three papers. <i>Duration :</i> The scheme is expected to be completed within three years. <i>Grant asked for :</i> <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 3,000</td></tr> <tr> <td>Staff : (one J. R. A.)</td><td>Rs. 2,805 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 5,805 (including allowances)</td></tr> </table> <i>Research Committee's recommendation :</i> The Pharmaceuticals & Drugs Research Committee in its meeting held on February 6, 1955 recommended the scheme for sanction with Rs. 2000/- for contingencies and one J. R. A.	Equipment	Nil	Contingencies	Rs. 3,000	Staff : (one J. R. A.)	Rs. 2,805 (including allowances)	Total	Rs. 5,805 (including allowances)
Equipment	Nil								
Contingencies	Rs. 3,000								
Staff : (one J. R. A.)	Rs. 2,805 (including allowances)								
Total	Rs. 5,805 (including allowances)								
45	Subject : Synthesis of thiophene analogues of sterols and polycyclic hydrocarbons: a study in chemical carcinogenesis—Dr. B. D. Tilak, Bombay University. <i>Aim and scope :</i> The object of this scheme is to carry out synthesis of thiophene analogues of sterols and polycyclic hydrocarbons and to investigate their carcinogenic activity with a view to gaining information on the relation between carcinogenic activity and chemical constitution. The investigation may also lead to synthesis of products with definite tumour inhibitory properties.								

Recommendations of the Committee of the Board	Recommendations of the Board								
44 p. 153-155 The Committee recommended approval of the research scheme on 'Vitamin C in relation to diabetes' by Dr. S. Banerjee and sanction of the following grant : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,500</td></tr> <tr> <td>Staff : (I JRA)</td><td>Rs. 3,060 (including allowances).</td></tr> <tr> <td>Total</td><td>Rs. 4,560 " "</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 1,500	Staff : (I JRA)	Rs. 3,060 (including allowances).	Total	Rs. 4,560 " "	44 p. 153-155 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,500								
Staff : (I JRA)	Rs. 3,060 (including allowances).								
Total	Rs. 4,560 " "								

RESEARCH SCHEMES

Item No.	Particulars								
	The compounds proposed to be synthesised are (i) thiophene analogue of equilenin and other steroids (ii) thiophene isosters of chloranthrene, 20-methyl chloranthrene and benzacridine. <i>Author's record :</i> The author has synthesised thiophene analogues of carcinogenic hydrocarbons with the object of elucidating the problem of endogenous carcinogens. He has also developed new methods for the synthesis of sulphur heterocyclic and several unknown ring systems containing the thiophene nucleus. The work has been published. <i>Collaboration :</i> Cooperation of Dr. V. R. Khanolkar, Director, Indian Cancer Research Institute, Bombay will be available for biological work. <i>Duration :</i> The scheme is for three years in the first instance. <i>Grant asked for :</i> <table> <tr> <td>Equipment \</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1500</td></tr> <tr> <td>Staff : (one S. R. A.).</td><td>Rs. 3,968 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 5,468 (including allowances)</td></tr> </table> <i>Research Committee's recommendation :</i> The Pharmaceuticals and Drugs Research Committee at its meeting held on February 6, 1955 recommended the scheme for sanction.	Equipment \	Nil	Contingencies	Rs. 1500	Staff : (one S. R. A.).	Rs. 3,968 (including allowances)	Total	Rs. 5,468 (including allowances)
Equipment \	Nil								
Contingencies	Rs. 1500								
Staff : (one S. R. A.).	Rs. 3,968 (including allowances)								
Total	Rs. 5,468 (including allowances)								
46	Subject : Preparation of steroid hormones from diosgenin—Dr. R. N. Chakravarti, Professor of Chemistry, School of Tropical Medicine, Calcutta. <i>Aim & scope :</i> The object of this scheme is to develop suitable methods for conversion of diosgenin derived from <i>D. prazeri</i> and <i>D. deltoidea</i> to cortisone and other steroid hormones.								

Recommendations of the Committee of the Board	Recommendations of the Board								
45 p. 155-157 The Committee recommended that the research scheme on 'Synthesis of thiophene analogues of sterols and polycyclic hydrocarbons' by Dr. B.D. Tilak be approved and the following grant be sanctioned : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,500</td></tr> <tr> <td>Staff : (I SRA)</td><td>Rs. 4,329 (including allowances).</td></tr> <tr> <td>Total</td><td>Rs. 5,829 " "</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 1,500	Staff : (I SRA)	Rs. 4,329 (including allowances).	Total	Rs. 5,829 " "	45 p. 155-157 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,500								
Staff : (I SRA)	Rs. 4,329 (including allowances).								
Total	Rs. 5,829 " "								

Item No.	Particulars												
	The following lines of work are proposed to be followed : (i) Devising suitable methods for the large scale isolation of diosgenin from <i>D. prazeri</i> and <i>D. deltoidea</i>. (ii) Conversion of diosgenin into pregnenolone. (iii) Conversion of diosgenin into progesterone. (iv) Studies on microbiological oxygenation of progesterone with a view to its conversion into 11-oxygenated progesterone. (v) Conversion of 11-hydroxyprogesterone into cortisone. (vi) Conversion of diosgenin into other steroid hormones. Diosgenin has been extracted from a number of Mexican Dioscorea plants, Balanites and American Trillinin plants and its conversion to some useful steroids carried out. Syntex S. A. Mexico are reported to be utilising diosgenin from Mexican Dioscorea for manufacture of steroid hormones. <i>Author's record :</i> The author has carried out a detailed survey of Indian Dioscorea species and a systematic chemical examination of nineteen species. <i>D. prazeri</i> and <i>D. deltoidea</i> have given yields of 2.1 and 3.35 % diosgenin respectively. This is higher than that reported for plants worked abroad. The proposed work will be in continuation of this work. <i>Collaboration :</i> Dr. (Mrs.) D. Chakravarti, Bethune College, Calcutta will collaborate. <i>Duration :</i> The scheme is expected to take about three years. <i>Grant asked for :</i> <table><tr><td>Equipment</td><td>...</td><td>Nil</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 1,500</td></tr><tr><td>Staff : (One J. R. A.)</td><td>...</td><td>Rs. 2,805 (including allowances)</td></tr><tr><td>Total</td><td>...</td><td>Rs. 4,305 (including allowances)</td></tr></table> <i>Research Committee's recommendation :</i> The Pharmaceuticals and Drugs Research Committee in its meeting held on February 6, 1955 recommended the scheme with the grant asked for.	Equipment	...	Nil	Contingencies	...	Rs. 1,500	Staff : (One J. R. A.)	...	Rs. 2,805 (including allowances)	Total	...	Rs. 4,305 (including allowances)
Equipment	...	Nil											
Contingencies	...	Rs. 1,500											
Staff : (One J. R. A.)	...	Rs. 2,805 (including allowances)											
Total	...	Rs. 4,305 (including allowances)											

Recommendations of the Committee of the Board	Recommendations of the Board								
46 p. 157-159 The Committee recommended that the research scheme on 'Steroid hormones from diosgenin' by Dr. R.N. Chakravarti be approved and the following grant be made : <table><tr><td>Equipment</td><td>Nil</td></tr><tr><td>Contingencies</td><td>Rs. 1,500</td></tr><tr><td>Staff : (I JRA)</td><td>Rs. 3,110 (including allowanees).</td></tr><tr><td>Total</td><td>Rs. 4,610</td></tr></table>	Equipment	Nil	Contingencies	Rs. 1,500	Staff : (I JRA)	Rs. 3,110 (including allowanees).	Total	Rs. 4,610	46 p. 157-159 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,500								
Staff : (I JRA)	Rs. 3,110 (including allowanees).								
Total	Rs. 4,610								

RESEARCH SCHEMES

Item No.	Particulars										
47	Subject : Search for new insecticides—Chemical investigation of plant insecticides— Dr. N. V. Subha Rao, Head of the Department of Chemistry, University College of Science, Hyderabad (Dn). Aim & scope : The object of this scheme is to explore the insecticidal value of plants belonging to the genera Tephresia, Mundulea, Randia and Albizzia. The investigation will be carried out according to the following programme : - Isolation of chemical components responsible for insecticidal action. - Establishment of the chemical constitution of the isolated components. - Assessment of the insecticidal value of the components. Author's record : The author has been working in the subject and already published a few papers. Collaboration : Tests on insects will be carried out in the Entomology Section of the Agricultural Research Station, Hyderabad. Duration : Results of interest are expected within two or three years. Grant asked for : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies : (Solvents etc.)</td><td>Rs. 2,500</td></tr> <tr> <td>Staff :</td><td>Rs. 6,270 (including allowances)</td></tr> <tr> <td>(Two J. R. As., one Lab. Peon)</td><td></td></tr> <tr> <td>Total :—</td><td>Rs. 8,770 (including allowances)</td></tr> </table> Research Committee's recommendation : The Pharmaceuticals & Drugs Research Committee considered the scheme in its meeting held on February 6, 1955 and recommended the scheme with Rs. 1000/- for contingencies and one J. R. A. and further desired that the investigator may be asked to concentrate on Mundulea and Albizzia.	Equipment	Nil	Contingencies : (Solvents etc.)	Rs. 2,500	Staff :	Rs. 6,270 (including allowances)	(Two J. R. As., one Lab. Peon)		Total :—	Rs. 8,770 (including allowances)
Equipment	Nil										
Contingencies : (Solvents etc.)	Rs. 2,500										
Staff :	Rs. 6,270 (including allowances)										
(Two J. R. As., one Lab. Peon)											
Total :—	Rs. 8,770 (including allowances)										

Recommendations of the Committee of the Board	Recommendations of the Board								
47 p. 161 The Committee recommended that the research scheme on 'New Insecticides' by Dr. N.V. Subha Rao be approved and the following grant be made : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (I JRA)</td><td>Rs. 2,940 (including allowances).</td></tr> <tr> <td>Total</td><td>Rs. 3,940</td></tr> </table> The Committee further recommended that Dr. Subha Rao be requested to confine his attention to Mundulea and Albizzia.	Equipment	Nil	Contingencies	Rs. 1,000	Staff : (I JRA)	Rs. 2,940 (including allowances).	Total	Rs. 3,940	47 p. 161 The Board endorsed the recommendations of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff : (I JRA)	Rs. 2,940 (including allowances).								
Total	Rs. 3,940								

RESEARCH SCHEMES

Item No.	Particulars
48	Subject : Pilot plant production of insecticides from Indian turpentine—Dr. S. H. Zaheer and Mr. Bharat Bhushan, Central Laboratories for Scientific & Industrial Research, Hyderabad. Aim & scope : The objects of this scheme are (i) to carry out pilot plant trials of chlorinated turpentine production in order to work out the cost of production (ii) to test the insecticidal action of the product in large scale field trials on agricultural crops and (iii) to carry out laboratory scale experiments on the introduction of thiocynoacetate and thiocyno groupings in chlorinated turpentine molecule with the object of improving the insecticidal action. It is also proposed to carry out laboratory scale investigation on the introduction of thiocynoacetate group in the chlorinated turpentine by the following route : $\text{Chlorinated turpentine} + \text{NaOOC} \cdot \text{CH}_2\text{Cl} \xrightarrow{+\text{NH}_4\text{SCN}} \text{ROOC} \cdot \text{CH}_2\text{SCN}$ chloroacetate thiocynoacetate (R—chlorinated terpene radical) The product is likely to have the toxicity of chlorinated turpentine and knock down action of Thanite (isobornyl thiocynoacetate) and fenchyl thiocynoacetate. Introduction of only thiocyno group into the chlorinated turpentine molecule will also be investigated. The proposer of the scheme has carried out preliminary pilot plant trials on chlorination of turpentine and obtained a product containing 68% chlorine, with HCl as by product. On the basis of a 48 hour run the cost of production has been estimated at As. 2.8 in preliminary trials as against D. D. T. at Rs. 4/- per lb. Author's record : Test reports of the chlorinated turpentine have indicated a high degree of suitability against a wide range of domestic and agricultural insects and non-toxicity to warm blooded animals, but it is necessary to confirm the results of these preliminary trials. Duration : The project is expected to take two years for completion.

Recommendations of the Committee of the Board	Recommendations of the Board
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RESEARCH SCHEMES

Item No.	Particulars
49	<i>Grant asked for :</i>
	Equipment : Rs. 6,000 (Absorption tower etc.)
	Contingencies Rs. 1,000
	Staff: Rs. 4,870 (including allowances) (One S. R. A. and one Lab.Attendant).
	Total Rs. 11,870 (including allowances)
	<i>Research Committee's recommendation :</i>
	The Pharmaceuticals & Drugs Research Committee in its meeting held on February 6, 1955 recommended the scheme for sanction with the grant asked for.
	<i>Subject : Synthetic investigation in carcinogens and anticarcinogens—Dr. S. M. Mukherji, Head of the Department of Chemistry, Punjab University, Hoshiarpur.</i>
	<i>Aim & scope :</i>
	The object of the proposed scheme is to synthesise some new polycyclic hydrocarbon derivatives likely to exhibit carcinogenic and anti-carcinogenic activity and test their activity.
	The programme of work will comprise :-
	(i) Synthesis of derivatives of 3 : 4-benzphenanthrenes with one methyl group at 2-position, essential for increased carcinogenic activity, by application of the method developed by the author or the synthesis of the derivatives of methyl-3 : 4-benzphenanthrene.
	(ii) Synthesis of mono methoxy derivatives of 2-methyl 3 : 4 benzophenanthrene and 2 : 9-benzophenanthrene by the method developed by the author.
	Some mono methoxy derivatives of polycyclic aromatic hydrocarbons are reported to inhibit tumour growth strongly.
	(iii) Synthesis of dimethoxy derivatives of 3 : 4 benzophenanthrene by Mukherji's method and their metal ammonia reduction to obtain saturated and unsaturated ketones expected to exhibit biological activity.
	No satisfactory anticarcinogenic or tumour growth inhibitors appear to have been discovered so far.

Recommendations of the Committee of the Board	Recommendations of the Board
48 p. 163-165. The Committee recommended that the research scheme on 'Pilot plant production of insecticides from Indian turpentine' by Dr. S.H. Zaheer and Mr. Bharat Bhushan be approved and the following grant be made : Equipment Rs. 6,000 Contingencies Rs. 1,000 Staff: (I SRA) Rs. 4,152 (including allowances). Total Rs. 11,152 " "	48 p. 163-165 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
50	<i>Author's record :</i> Dr. Mukherji has developed a novel method for the synthesis of 2-methyl-3 : 4-benzophenanthrene derivatives. The work has been reported in two papers.
	<i>Collaboration :</i> Biological testing of compounds synthesised could be done at the Central Drug Research Institute, Lucknow, or other Institutes in India and abroad.
	<i>Duration :</i> The scheme will require at least three years for completion.
	<i>Grant asked for :</i>
	Equipment : ... Rs. 3,000 (High pressure hydrogenation apparatus etc.)
	Contingencies ... Rs. 5,000
	Staff : (One S.S.A., & one S.L.A.) ... Rs. 5,192 (including allowances)
	Total Rs. 13,192 (including allowances)
	<i>Research Committee's recommendation :</i> The Pharmaceuticals and Drugs Research Committee in its meeting held on February 6, 1955 recommended the scheme provided the Punjab University supplied the high pressure hydrogenation apparatus. The following grant was recommended :—
	Equipment : Nil Contingencies ... Rs. 2,000 Staff : (1 J. S. A.) ... Rs. 2,420 (including allowances) Total Rs. 4,420 (including allowances)
<i>Subject :</i> Determination of heat resistance of spores of food spoilage bacteria of significance to canning industry—Dr. A. N. Bose, Professor of Food Technology, College of Engineering and Technology, Calcutta.	
<i>Aim & scope :</i> The object of the scheme is to study the thermal resistance of food spoilage bacteria isolated by the investigator with the object of arriving at a correct processing time for canned products, particularly curried products.	

Recommendations of the Committee of the Board	Recommendations of the Board								
49 p. 165-167 The Committee recommended that the research scheme on 'Carcinogens and anticarcinogens' by Dr. S.M. Mukherji be approved and the following grant be made provided the Punjab University made available a high pressure hydrogenation apparatus to Dr. Mukherji : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,500</td></tr> <tr> <td>Staff : (1 JRA)</td><td>Rs. 2,640 (including allowances).</td></tr> <tr> <td></td><td><u>Total Rs. 4,140</u></td></tr> </table> " "	Equipment	Nil	Contingencies	Rs. 1,500	Staff : (1 JRA)	Rs. 2,640 (including allowances).		<u>Total Rs. 4,140</u>	49 p. 165-167 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,500								
Staff : (1 JRA)	Rs. 2,640 (including allowances).								
	<u>Total Rs. 4,140</u>								

Item No.	Particulars																
	Processing time for canning is determined by correlating heat penetration data and heat death time data. Death time data of spoilage causing bacteria being one of the factors in calculating processing time, an error in the determination of this factor results in causing either over processing or under processing of the canned product. The programme of work will include studies on : (i) different methods of sporulation with reference to thermal resistance of bacteria in presence of salt, sugar, acid etc., with heat resistant organisms isolated in the author's laboratory and other well known food spoiling thermophiles isolated elsewhere ; (ii) the media of sub-culturing used after heat treatment on the thermal resistance of bacteria ; (iii) thermal resistance of bacteria in different substrates. The investigation will be of use in minimising spoilage of canned products which is now of frequent occurrence in indigenous canneries and thus help the industry. Effect of acid, sugar, salt, spices, fat etc., will be studied with reference to different substrates. This is of special significance in canned foods. <i>Author's record :</i> Dr. Bose has isolated two heat resistant spoilage bacteria, <i>B. subtilis</i> and <i>B. coagulans</i> from locally canned vegetables and determined their heat resistance in phosphate buffer and food substrate and studied the effect of added ingredients and methods of sporulation. It is proposed to follow up the work. <i>Duration :</i> The scheme will take two years. <i>Grant asked for :</i> <table><tr><td>Equipment</td><td>...</td><td>Nil</td><td></td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 1,200</td><td></td></tr><tr><td>Staff : (1 J. R. A.)</td><td>...</td><td>Rs. 2,805</td><td>(including allowances)</td></tr><tr><td>Total</td><td></td><td>Rs. 4,005</td><td>(including allowances)</td></tr></table>	Equipment	...	Nil		Contingencies	...	Rs. 1,200		Staff : (1 J. R. A.)	...	Rs. 2,805	(including allowances)	Total		Rs. 4,005	(including allowances)
Equipment	...	Nil															
Contingencies	...	Rs. 1,200															
Staff : (1 J. R. A.)	...	Rs. 2,805	(including allowances)														
Total		Rs. 4,005	(including allowances)														

Recommendations of the Committee of the Board	Recommendations of the Board

RESEARCH SCHEMES

Item No.	Particulars	
51	<i>Research Committee's recommendation :</i>	
	The scheme was considered by the Biochemical Research Committee at its meeting held on January 3, 1955. The Committee recommended the scheme for sanction with the following grant :	
	Equipment	Nil
	Contingencies	Rs. 1,000
	Staff : (One J.R.A.)	Rs. 2,805 (including allowances)
	Total	Rs. 3,805 (including allowances)
	<i>Subject : Biosynthesis of B-complex vitamins—Dr. Rajgopalan, Lecturer in Biochemistry, Indian Institute of Science, Bangalore.</i>	
	<i>Aim & scope :</i>	
	It is proposed to investigate in detail the role of curd feeding in the bio-synthesis of B-complex vitamins in the intestines by human feeding experiments.	
	The following programme of work is proposed to be carried out :	
(i) Isolation of the major-types of micro-organisms from caeca and intestines and determination of the types responsible for synthesis of a particular B-complex vitamin.		
(ii) Study of the changes in type and number of these bacteria as influenced by dietary factors.		
(iii) Effect of curds on the biosynthesis of members of B-complex vitamins other than thiamine which has been investigated.		
(iv) Role of curds in the synthesis of thiamine with a view to determine whether the beneficial action of curds is due to its bacterial flora. The study is expected to throw light on whether the synthesis is due to the bacteria or the milk proteins.		
(v) Study of the influence of vegetable milks and curd on biosynthesis of B-complex vitamins.		
(vi) Human feeding experiments for 6-9 months.		

Recommendations of the Committee of the Board	Recommendations of the Board								
50 p. 167-171 The Committee recommended that the research scheme on 'Heat resistance of spores of food spoilage bacteria' by Dr. A. N. Bose be sanctioned with the following grant : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (1 JRA)</td><td>Rs. 3,060 (including allowances).</td></tr> <tr> <td>Total</td><td>Rs. 4,060 " "</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 1,000	Staff : (1 JRA)	Rs. 3,060 (including allowances).	Total	Rs. 4,060 " "	50 p. 167-171 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff : (1 JRA)	Rs. 3,060 (including allowances).								
Total	Rs. 4,060 " "								

RESEARCH SCHEMES

Item No.	Particulars
	<i>Author's record :</i>
	The author has observed highly beneficial influence of curd feeding on human health and the synthesis of thiamine in human feeding experiments.
	<i>Collaboration :</i>
	Co-operation of the orphanages of Bangalore will be available for carrying out the proposed human feeding experiments.
	<i>Duration :</i>
	The proposed programme will take a minimum period of three years.
	<i>Grant asked for :</i>
	Equipment ... Nil
	Contingencies ... Rs. 2,000
	Staff :
	(Two J. R. As. and one Lab. Helper) ... Rs. 6,270 (including allowances)
	Total ... Rs. 8,270 (including allowances)
	<i>Research Committee's recommendation :</i>
	The scheme was considered by the Biochemical Research Committee at its meeting held on January 3, 1955. The Committee recommended the scheme for sanction with the proviso that the programme of work be confined to the study of (a) the effect of curds on the biosynthesis of members of B-complex vitamins (b) the role of curds in the synthesis of thiamine, and (c) influence of groundnut and soyabean curds on biosynthesis of B-complex vitamins. The following grant was recommended :
	Equipment ... Nil
	Contingencies ... Rs. 1,000
	Staff : (One J. S. A. on Rs. 200/-) ... Rs. 3,420 (including allowances)
	Total ... Rs. 4,420 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board
51 p. 171-173 The Committee recommended the research scheme on 'Biosynthesis of B-complex vitamins' by Dr. Rajgopalan for approval and sanction of the following grant : Equipment Nil Contingencies Rs. 1,000 Staff: (1 JRA, Rs. 3,420 p.m. including allowances on Rs. 200 Total Rs. 4,420 " "	51 p. 171-173 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

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Item No.	Particulars								
52	Subject : Isolation and study of the biologically important constituents of the venoms of cobra and Russell's viper—Dr. P. M. Wagle, Director, Haffkine Institute, Bombay. Aim & scope : The investigation is proposed to be carried out on the following lines : - Fractionation of the constituents of the venoms by well known methods. - Testing of the fractions for purity and homogeneity by electrophoresis. - Characterisation of the biologically active constituents by their physical, immunological, biochemical and pharmacological properties - Study of the inhibition of the proteolytic enzymes by inhibitors. This may throw more light on the origin and inter-relation of the different species of snakes. Author's record : The author has conducted preliminary investigation on the constituents of venoms and their proteolytic activity. Work on fractionation of cobra venom has also been initiated and fairly pure fractions isolated. An apparatus for continuous electrophoresis has been set up. Collaboration : Guidance on biochemical and immunological aspects by Dr. S. S. Rao and on pharmacological aspects by Dr. N. K. Dutta will be available. Duration : The investigation is expected to take about two years. Grant asked for : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (one S. R. A.)</td><td>Rs. 3,968 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 4,968 (including allowances)</td></tr> </table> Research Committee's recommendation : The Biochemical Research Committee considered the scheme at its meeting held	Equipment	Nil	Contingencies	Rs. 1,000	Staff : (one S. R. A.)	Rs. 3,968 (including allowances)	Total	Rs. 4,968 (including allowances)
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff : (one S. R. A.)	Rs. 3,968 (including allowances)								
Total	Rs. 4,968 (including allowances)								

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Recommendations of the Committee of the Board	Recommendations of the Board

RESEARCH SCHEMES

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Item No.	Particulars								
	on January 3, 1955. The Committee felt that the work may yield important findings and recommended it for sanction with the following grant :								
	<table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (one S. R. A.)</td><td>Rs. 4,230 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 5,230 (including allowances)</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 1,000	Staff : (one S. R. A.)	Rs. 4,230 (including allowances)	Total	Rs. 5,230 (including allowances)
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff : (one S. R. A.)	Rs. 4,230 (including allowances)								
Total	Rs. 5,230 (including allowances)								
	The Committee further recommended that the investigator may contact Dr. (Mrs) Kamala Sohoni for possible link up with her work on trypsin inhibitors.								
	The Pharmaceuticals & Drugs Research Committee also considered the scheme at its meeting held on February 6, 1955 and recommended it for a grant-in-aid.								
53	Subject : Pilot plant manufacture of monomeric dehydrated castor oil—Dr. S. A. Saletore, Central Laboratories for Scientific & Industrial Research, Hyderabad (Dn.). Aim & scope : It is proposed to carry out pilot plant investigation for production of monomeric dehydrated castor oil of very high quality and free from objectionable dark colour and after-tack. Dehydrated castor oil is being extensively used for making alkyd finishes of light colour, baking white enamels and coating for food containers. Its manufacture is an established industry in foreign countries but the process is a guarded secret. Author's work : The production of dehydrated castor oil of good quality has been investigated on laboratory scale in the Central Laboratories, Hyderabad. A patent has been taken out (Ind. Patent No. 46547). Duration : The scheme is likely to take two years.								

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Recommendations of the Committee of the Board	Recommendations of the Board								
52 p. 175-177 The Committee recommended the research scheme on 'Study of venoms of cobra and Russell's viper' by Dr. P. M. Wagle for the following grant : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (1 SRA)</td><td>Rs. 4,329 (including allowances).</td></tr> <tr> <td>Total</td><td>Rs. 5,329 „ „</td></tr> </table> The Committee further recommended that Dr. Wagle be requested to explore the possibility of co-ordinating the programme of work with that of Dr. (Mrs). Kamala Sohoni on trypsin inhibitors.	Equipment	Nil	Contingencies	Rs. 1,000	Staff : (1 SRA)	Rs. 4,329 (including allowances).	Total	Rs. 5,329 „ „	52 p. 175-177 The Board endorsed the recommendations of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff : (1 SRA)	Rs. 4,329 (including allowances).								
Total	Rs. 5,329 „ „								

Item No.	Particulars
54	<i>Grant asked for :</i>
	Equipment : Rs. 60,000 (Pilot plant with accessories)
	Contingencies Rs. 5,000
	Staff : (1 S. S. A., 1 J. Lab. Asstt.) Rs. 5,655 (including allowances)
	Total Rs. 70,655 (including allowances)
	<i>Research Committee's recommendation :</i>
	The Vegetable Oils Research Committee in its meeting held on Jan. 12, 1955 recommended the scheme for one year only with the contingent grant of Rs. 1,500/- and one Senior Scientific Assistant if a person with adequate qualifications is available, otherwise a Junior Scientific Assistant.
	<i>Subject : Studies on phosphatides of Indian vegetable oils and cakes—Dr. K. S. Murti, Principal, Oil Technological Institute, Anantapur.</i>
	<i>Aim & scope :</i>
	The object of this scheme is to carry out a systematic study of the phosphatide content of Indian vegetable oils of commercial importance obtained by different methods of extraction on a pilot plant scale and the possible utilisation of these vegetable phosphatides in the various industries.
54	Some preliminary work on phosphatide content of Indian vegetable oils and cakes has been reported. But no systematic work on phosphatide content of the major Indian oilseeds, oils and cakes or their recovery has been carried out.
	<i>Author's record :</i>
	The author has investigated the phosphatide content of groundnut oil from mills in the Madras State and determined the purity of the products by estimation of phosphorus content and presented a paper on the subject at the Symposium on Oils and Fats held in Bombay.

Recommendations of the Committee of the Board	Recommendations of the Board
53 p. 177-179 The Committee recommended that the research scheme on 'Pilot plant manufacture of monomeric dehydrated castor oil' by Dr. S. A. Saletore be approved. The following grant be sanctioned provided the equipment for the pilot plant was made available by the Central Laboratories. Equipment Nil Contingencies Rs. 1,500 Staff. (1 SRA Rs. 2,940 (including allowances). or 1 JRA according to qualification) Total Rs. 4,440 " "	53 p. 177-179 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars								
	It is proposed to extend the work to other oils as well. <i>Duration :</i> Not less than two years will be required for completion of the scheme. <i>Grant asked for :</i> <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,200</td></tr> <tr> <td>Staff : (One J. S. A. and One Lab. Attendent)</td><td>Rs. 3,540 (including allowances)</td></tr> <tr> <td>Total</td><td>Rs. 4,740 (including allowances)</td></tr> </table> <i>Research Committee's recommendation :</i> The Vegetable Oils Research Committee in its meeting held on January 12, 1955 considered the scheme and recommended it for one year with a Junior Scientific Assistant and a contingency grant of Rs. 1000. The Committee desired that the programme should lay emphasis on the study of the oils on laboratory scale and the oil cakes on a pilot plant scale. 55 <i>Subject : Preparation of vinyl plastics from alcohol and chlorine—Dr. D. N. Daruvalla, Shri Ram Institute for Industrial Research, Delhi.</i> <i>Aim and scope :</i> The object of this scheme is the pilot plant study of the manufacture of vinyl and vinylidene chloride from ethyl alcohol and chlorine and their polymerisation to suitable moulding powder, fibres and films. The proposed programme comprises : - Standardization of production of trichloroethane. - Dehydrochlorination of di and trichloroethane to yield vinyl and vinylidene chlorides using a fluidized bed catalyst. - Ultimate polymerisation to yield plastic moulding powders, films and other allied compositions.	Equipment	Nil	Contingencies	Rs. 1,200	Staff : (One J. S. A. and One Lab. Attendent)	Rs. 3,540 (including allowances)	Total	Rs. 4,740 (including allowances)
Equipment	Nil								
Contingencies	Rs. 1,200								
Staff : (One J. S. A. and One Lab. Attendent)	Rs. 3,540 (including allowances)								
Total	Rs. 4,740 (including allowances)								

Recommendations of the Committee of the Board	Recommendations of the Board								
54 p. 179-181 The Committee recommended the research scheme on 'Phosphatides of Indian vegetable oils and cakes' by Dr. K.S. Murti for sanction with the following grant : <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff : (1 JRA)</td><td>Rs. 2,640 (including allowances).</td></tr> <tr> <td>Total</td><td>Rs. 3,640 " "</td></tr> </table> It was also recommended that both oils and oil cakes should be studied on the laboratory scale during the first year.	Equipment	Nil	Contingencies	Rs. 1,000	Staff : (1 JRA)	Rs. 2,640 (including allowances).	Total	Rs. 3,640 " "	54 p. 179-181 The Board endorsed the recommendations of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff : (1 JRA)	Rs. 2,640 (including allowances).								
Total	Rs. 3,640 " "								

Item No.	Particulars												
	The raw materials are available in India and are better suited economically as starting materials than acetylene and hydrochloric acid. <i>Author's record :</i> Working conditions for large scale manufacture of ethylene using a fluidised bed catalyst, and its chlorination to yield optimum quantity of dichloro ethylene have been worked out under a C. S. I. R. scheme (Pat. No. 59159) at the Institute. The proposed scheme is in continuation of this work. <i>Duration :</i> The scheme is for two years. <i>Grant asked for :</i> <table><tr><td>Equipment</td><td>...</td><td>Nil</td></tr><tr><td>Contingencies</td><td>...</td><td>Re. 3,000</td></tr><tr><td>Staff : (One S. R. A.)</td><td>...</td><td>Rs. 3,808 (including allowances)</td></tr><tr><td>Total</td><td>...</td><td>Rs. 6,808 (including allowances)</td></tr></table> <i>Research Committee's recommendations :</i> The Plastics Research Committee in its meeting held on the 28th January 1955 considered the scheme and noted that the Chemical Engineering Section of the N. C. L. was working on this project on a laboratory scale at present. It was also felt that the work at Shri Ram Institute for Industrial Research on ether and ethylene dichloride had been taken almost to a semi-commercial stage. The Committee recommended that the scheme be sanctioned, and the Shri Ram Institute for Industrial Research be asked to get specific results within two years. The Committee felt that the work at the N. C. L. may also continue as a certain amount of duplication in this kind of work was highly desirable for early results. The Committee also agreed that Dr. Kapur may send a note giving the views of the N. C. L. for circulation to members.	Equipment	...	Nil	Contingencies	...	Re. 3,000	Staff : (One S. R. A.)	...	Rs. 3,808 (including allowances)	Total	...	Rs. 6,808 (including allowances)
Equipment	...	Nil											
Contingencies	...	Re. 3,000											
Staff : (One S. R. A.)	...	Rs. 3,808 (including allowances)											
Total	...	Rs. 6,808 (including allowances)											

Recommendations of the Committee of the Board	Recommendations of the Board								
55 p. 181-183 The Committee recommended that the research scheme on 'Vinyl plastics from alcohol and chlorine' by Dr. D. N. Daruvalla be approved and the following grant be made : <table> <tr> <td>Equipment :</td><td>Nil</td></tr> <tr> <td>Contingencies :</td><td>Rs. 2,000</td></tr> <tr> <td>Staff (1 JRA) :</td><td>Rs. 4,152 (including allowances)</td></tr> <tr> <td>Total :</td><td>Rs. 6,152</td></tr> </table>	Equipment :	Nil	Contingencies :	Rs. 2,000	Staff (1 JRA) :	Rs. 4,152 (including allowances)	Total :	Rs. 6,152	55. p. 181-183 The Board endorsed the recommendation of its Committee.
Equipment :	Nil								
Contingencies :	Rs. 2,000								
Staff (1 JRA) :	Rs. 4,152 (including allowances)								
Total :	Rs. 6,152								

RESEARCH SCHEMES

Item No.	Particulars												
56	Subject : Preparation of maleic anhydride from benzene, turpentine etc.—Dr. D. N. Daruvalla, Shri Ram Institute for Industrial Research, Delhi. Aim and scope : The object of this scheme is to study the preparation of maleic anhydride from raw materials available in India (benzene, turpentine etc.) by fluidised technique. In foreign countries maleic acid is being manufactured by vapour oxidation of benzene, toluene etc. but the process is a closely guarded secret. Maleic acid is an important raw material for alkyd resins. Duration : The scheme will take two years. Grant asked for : <table><tr><td>Equipment</td><td>...</td><td>Nil</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 2,000</td></tr><tr><td>Staff : (One J. R. A.)</td><td>...</td><td>Rs. 2,695 (including allowances)</td></tr><tr><td>Total</td><td>...</td><td>Rs. 4,695 (including allowances)</td></tr></table> Research Committee's recommendation : The Plastics Research Committee in its meeting held on the 28th January 1955 recommended that the scheme be sanctioned with the provision that the title of the scheme be 'preparation of maleic anhydride from benzene and turpentine' and the work using benzene be taken in hand first as there was urgent need for the material.	Equipment	...	Nil	Contingencies	...	Rs. 2,000	Staff : (One J. R. A.)	...	Rs. 2,695 (including allowances)	Total	...	Rs. 4,695 (including allowances)
Equipment	...	Nil											
Contingencies	...	Rs. 2,000											
Staff : (One J. R. A.)	...	Rs. 2,695 (including allowances)											
Total	...	Rs. 4,695 (including allowances)											
57	Subject : Studies in the viscosity of cellulose solutions—Dr. V. B. Chipalkatti, Assistant Director, Shri Ram Institute for Industrial Research, Delhi. Aim & scope : The aim of the proposed scheme is to collect detailed experimental data on the viscosity behaviour of cellulose in phosphoric acid solutions with the object of gaining information on the significance of viscosity and the inter molecular structure of cellulose.												

Recommendations of the Committee of the Board	Recommendations of the Board								
56 p. 185 The Committee recommended that the research scheme on 'Maleic anhydride from benzene' by Dr. D. N. Daruvalla be sanctioned with the following grant : <table> <tr> <td>Equipment :</td><td>Nil</td></tr> <tr> <td>Contingencies :</td><td>Rs. 1,500</td></tr> <tr> <td>Staff (1 JRA) :</td><td>Rs. 2,940 (including allowances)</td></tr> <tr> <td>Total :</td><td>Rs. 4,440</td></tr> </table>	Equipment :	Nil	Contingencies :	Rs. 1,500	Staff (1 JRA) :	Rs. 2,940 (including allowances)	Total :	Rs. 4,440	56 p. 185 The Board endorsed the recommendation of its Committee.
Equipment :	Nil								
Contingencies :	Rs. 1,500								
Staff (1 JRA) :	Rs. 2,940 (including allowances)								
Total :	Rs. 4,440								

RESEARCH SCHEMES

Item No.	Particulars												
	The following programme of work is proposed : (i) Literature survey. (ii) Osmometric studies of cellulose in phosphoric acid to confirm theoretical conclusions arrived at through viscosity studies. (iii) Fractionation of cellulose by precipitation from phosphoric acid solutions. (iv) X-ray and viscometric studies of fractions obtained. The results might also elucidate the mechanism of cellulose aldehyde combination and offer an indirect explanation of the abnormal variation observed by research workers in the molecular weight of cellulose. Conflicting views are held regarding the dispersion of cellulose. While one school of workers is of the view that cellulose is micellarly dispersed in solution, others think that it is molecularly dispersed. The period of phosphoric acid fluidity is also the subject of controversy. <i>Author's record :</i> The author has carried out determination of the viscosity of cellulose in phosphoric acid by a modified technique and its relation with cuperammonium fluidity and claims that the method could be used for the fluidity of cellulose containing combined formaldehyde. The results have been published. More detailed investigation on both aspects is necessary. <i>Collaboration :</i> X-ray work is proposed to be done in collaboration with National Physical Laboratory, Delhi or the Textile Industries' Research Association, Ahmedabad. <i>Duration :</i> The scheme is for three years. <i>Grant asked for :</i> <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 900</td></tr> <tr> <td>Staff :</td><td>Rs. 6,478 (including allowances)</td></tr> <tr> <td>(One Research Officer on Rs. 350/- p.m.)</td><td></td></tr> <tr> <td>(One Lab. Helper on Rs. 75/- p.m.)</td><td></td></tr> <tr> <td>Total</td><td>Rs. 7,378 (including allowances)</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 900	Staff :	Rs. 6,478 (including allowances)	(One Research Officer on Rs. 350/- p.m.)		(One Lab. Helper on Rs. 75/- p.m.)		Total	Rs. 7,378 (including allowances)
Equipment	Nil												
Contingencies	Rs. 900												
Staff :	Rs. 6,478 (including allowances)												
(One Research Officer on Rs. 350/- p.m.)													
(One Lab. Helper on Rs. 75/- p.m.)													
Total	Rs. 7,378 (including allowances)												

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars
58	<i>Research Committee's recommendation :</i> The Cellulose Research Committee considered the scheme at its meeting held on January 3, 1955. The Committee thought that with good assistance, the work which was fairly interesting could be carried out in a year's time. The period of library work stipulated by Dr. Chipalkatti was, however, unnecessarily long in view of the work already done by Dr. Chipalkatti on the subject. It was therefore recommended that the scheme be sanctioned for a period of one year.
	<i>Subject : Physical research schemes</i>
	<i>Note :</i>
	58.0 The Physical Research Committee (Chairman : Dr. D.S. Kothari) at its meeting held on February 3, 1955 considered the following research schemes.
	58.1 Precision crystal optics in quartz and calcite for advanced instruments for polarization and other work by Dr. I. Ramakrishna Rao, Madras Institute of Technology, Madras. [The object of the scheme is to investigate the availability of suitable grade quartz and calcite in India and their utilization in optical components. The scheme is divided into two parts: (a) geological investigation on the available raw materials, and (b) development of the technique of optical grinding and polishing. Grant asked for : Equipment : Rs. 3,250 Contingencies : Rs. 3,000 Staff : Rs. 11,796 Total : Rs. 18,046 (including allowances)] The Research Committee felt that Dr. Rao should contact the Geological Survey of India for part (a) of the scheme and the National Physical Laboratory for part (b) to find out the work already done and then formulate a more precise scheme.
	58.2 Separation of gaseous mixtures by thermal diffusion column by Dr. B. N. Srivastava, Indian Association for the Cultivation of Science, Calcutta. [The object of the scheme is to investigate the conditions affecting the performance

Recommendations of the Committee of the Board	Recommendations of the Board
57 p. 185-189 The Committee recommended that the research scheme on 'Viscosity of cellulose solutions' by Dr. V. B. Chipalkatti be approved and the following grant be made : Equipment : Nil Contingencies : Rs. 900 Staff (1 JRA) : Rs. 4,152 (including allowances) Total : Rs. 5,052	57 p. 185-189 The Board endorsed the recommendation of its Committee.
58. 0 p. 189 The Committee noted.	58. 0 p. 189 The Board noted.
58. 1 p. 189 The Committee recommended that Dr. L. Ramakrishna Rao be requested to take necessary action as suggested by the Physical Research Committee and submit a revised scheme for consideration.	58. 1 p. 189 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
	characteristics of thermal diffusion columns for the purification of common gases and separation of gaseous mixtures.
	Grant asked for : Equipment : Rs. 16,000 Contingencies : Rs. 2,000
	Staff : Rs. 3,793 Total : Rs. 21,793 (including allowances)]
	The Research Committee was of the opinion that the scheme was not precise enough for being considered independently, and the work proposed under the scheme could as well be combined with that of the current scheme on "Thermal and inter-diffusion of gases" by Dr. Srivastava. The Committee felt that Dr. Srivastava may be requested to submit a revised scheme, if he so desires, in the light of this suggestion.
58.3	Millimeter microwave spectroscopy by Mr. Krishnaji, Allahabad University, Allahabad.
	The Committee was informed that the Radio Research Committee considered this scheme at its last meeting and did not recommend the scheme. The Physical Research Committee concurred.
58.4	Opening of a research section in oceanography by Dr. P. B. R. Murti, Andhra Polytechnic, Kakinada.
	[It is proposed to set up a unit for oceanographic research with the object of carrying out a thorough survey of oceanographic conditions of the Kakinada region in the East Coast of India.
	Grant asked for : Equipment : Rs. 82,500 Contingencies : Rs. 13,500
	Staff : Rs. 23,950 Total : Rs. 1,19,950 (including allowances)]
	The Physical Research Committee felt that the scheme was a very ambitious one and beyond the competency of the institution concerned and, therefore, did not recommend the scheme.
58.5	Applied optics by Shri S. Hariharan, Madras Institute of Technology, Madras.
	[It is proposed to take up investigation on interferometer optics under the revised scheme.
	Grant asked for : Equipment : Rs. 1,500 Contingencies : Rs. 500
	Staff : Rs. 6,545 Total : Rs. 8,545 (including allowances)]

<i>Recommendations of the Committee of the Board</i>	<i>Recommendations of the Board</i>
58. 2 p. 189-191 The Committee recommended that Dr. B. N. Srivastava be requested to submit a revised scheme on the lines suggested by the Physical Research Committee.	58. 2 p. 189-191 The Board endorsed the recommendation of its Committee.
58. 3 p. 191 The Committee did not recommend the scheme on 'Millimeter microwave spectroscopy' by Mr. Krishnaji as he had already a research scheme on microwave spectroscopy under his direction.	58. 3 p. 191 The Board did not recommend the scheme for sanction.
58. 4 p. 191 The Committee did not recommend the scheme as it was too ambitious for a polytechnic to handle.	58. 4 p. 191 The Board did not recommend the scheme for sanction.

RESEARCH SCHEMES

Item No.	Particulars
	The Research Committee was of the opinion that the scope of even this revised scheme of Shri Hariharan was too wide. (The original scheme was considered at the meeting of the Committee held on January 16, 1954 and not recommended). 58.6 Raman spectra of orthosilicates, orthotitanates and their halogen derivatives by Shri S. S. Bhatnagar, Lecturer in Physics, Allahabad University. [The object of the scheme is to (i) study the structure of orthosilicates and orthotitanates and (ii) to investigate variations occurring in the structure, bond-lengths, and force constants when the central atom is changed from silicon to titanium. Grant asked for : Equipment : Rs. 6,524 Contingencies : Rs. 1,000 Staff : Nil Total : Rs. 7,524 (including allowances)] The Committee was of the view that the work proposed to be undertaken is a difficult one and further, the author had not done any work in this line. The Committee did not recommend the scheme. 58.7 Investigations on colour in alkali halide crystals by Prof. John Alexander, Professor of Physics, Wilson College, Bombay. [The objects of this scheme are : (a) growing large single crystals of alkali halides by the method of Kyropoulos, (b) colouring these crystals by electrons, (c) study of absorption characteristics of these coloured crystals by setting up an ultra-violet spectrometer, (d) study of the electrical properties of coloured crystals, Grant asked for : Equipment & Contingencies : Amounts not specified. Staff : Rs. 2,805 (including allowances)] The Committee felt that the scheme should be more precise and on a modest scale and did not recommend it for sanction.

Recommendations of the Committee of the Board	Recommendations of the Board
58. 5 p. 191-193 The Committee recommended that Mr. S. Hariharan be requested to submit a revised scheme after consulting the Chairman of the Research Committee.	58. 5 p 191-193 The Board endorsed the recommendation of its Committee.
58. 6 p. 193 The Committee did not recommend the research scheme on 'Raman spectra of orthosilicates, orthotitanates etc.' by Mr. S. S. Bhatnagar as the problem was a difficult one and the author had not done any previous work in the subject.	58. 6 p. 193 The Board did not recommend the scheme for sanction.
58. 7 p. 193 The Committee recommended that Prof. John Alexander be requested to submit a more precise scheme.	58. 7 p. 193 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
59	Subject : Atmospheric research schemes Note : 59.0 The following schemes were considered by the Atmospheric Research Committee (Chairman : Dr. K. R. Ramanathan) on January 17, 1955 : 59.1 Clouds and cloud-physics, by Dr. M. W. Chiplonkar, Poona. 59.2 Experimental studies in cloud physics by Mr. R. Ramanadham, Waltair. 59.3 Research on clouds physics by Mr. E. G. Naik, Ahmedabad. 59.4 Research on cloud physics by Principal and Professor of Physics, Mysore. The Committee felt that in view of the establishment of a Rain and Cloud Physics Research Unit, it was not advisable to spread out its efforts. The scheme of Mr. Ramanadham however, includes a useful item, namely drop-size distribution in different types of rain. The Committee recommended that Mr. Ramanadham may be asked to send a brief scheme for this particular item alone and that the Chairman might deal with that. 59.5 The nature and origin of atmospherics by Dr. M. W. Chiplonkar, Poona. The scheme was considered in relation to Dr. Khastagir's work at Banaras. Under the programme of the International Geophysical Year, it would be desirable to set up three or four stations to work on atmospherics on a planned basis and Dr. Chiplonkar's could be one of them. India Meteorological Department could do the over-all monitoring. It was recommended that the scheme might be considered by the Radio Research Committee also and that a Sub-Committee consisting of the Chairmen of the two Committees and the Director General of Observatories might discuss and decide the programme of work. (This scheme has already been considered under item 32 p. 123-125 of this agenda.)
60	Subject : Radio research schemes Note : 60.0 The Radio Research Committee (Chairman : Dr. K.S. Krishnan) at its meeting held on January 19, 1955 considered the following research schemes :

Recommendations of the Committee of the Board	Recommendations of the Board
59. 0 p. 195 The Committee noted. 59. 1, 59. 2, 59. 3 & 59. 4 p. 195 The Committee agreed with the opinion of the Research Committee that research effort in the subject of 'Cloud Physics' should for the present be concentrated at the Rain and Cloud Physics Research Unit at Delhi and did not recommend grants-in-aid for research schemes in the subject elsewhere. It was recommended that the research scheme by Dr. Ramanadham be also examined in the light of this recommendation. 59. 5 p. 195 The Committee noted that the scheme had already been considered under item No. 32 page 123-125 of this agenda. 60. 0 p. 195 The Committee noted.	59. 0 p. 195 The Board noted. 59. 1, 59. 2, 59.3 & 59. 4 p. 195 The Board endorsed the recommendations of its Committee. 59. 5 p. 195 The Board noted. 60. 0 p. 195 The Board noted.

Item No.	Particulars
60.1	Development of small scale electronic computer by Mr. P. V. V. S. Sastry, Madras Institute of Technology, Madras. [It is proposed to construct a prototype electronic computer for mathematical calculations with the following characteristics : (a) It can be used for differential and integral calculations by using a digital-to-analogue converter ; (b) Calculation up to four digit numbers ; (c) It will have a limited storage capacity and will make use of cold cathode (d) It will make use of decimal systems. Grant asked for : Equipment : Rs. 7,000 Contingencies : Rs. 1,000 Staff : Rs. 4,070 Total : 12,070 (including allowances)] The Research Committee suggested that Mr. Sastry may be requested to work for some time with Prof. Rideout of the Indian Institute of Science, Bangalore, who is at present engaged in the construction of an electronic computer. Mr. Sastry may then resubmit the scheme for consideration by the Chairman.
60.2	Millimetre microwave spectroscopy by Mr. Krishnaji, Department of Physics, Allahabad University. [It is intended to develop the technique of millimetre wave spectroscopy and then study the structure of polyatomic molecules. Grant asked for : Equipment : Nil Contingencies : Rs. 2,400 Staff : Rs. 3,707 Total : 6,107 (including allowances)] The Radio Research Committee would like Mr. Krishnaji to complete his current research scheme on "Absorption of microwaves in 3 cm. region" before he takes up the proposed scheme. The Committee, therefore, did not recommend the scheme at this stage.
61	Subject : Research scheme on measurement of geological time in India Note : 61.0 The Committee for the Measurement of Geological Time in India considered the following scheme at its meeting held on December 30, 1954.

Recommendations of the Committee of the Board	Recommendations of the Board
60. 1 p. 197 The Committee endorsed the recommendation of the Research Committee that Mr. Sastry be requested to work for some time with Prof. Rideout at the Indian Institute of Science, Bangalore and then resubmit the scheme.	60. 1 p. 197 The Board endorsed the recommendation of the Research Committee.
60. 2 p. 197 The Committee noted that the research scheme had already been considered under item 58. 3 p. 191 of this agenda.	60. 2 p. 197 The Board noted.
61. 0 p. 197 The Committee noted.	61. 0 p. 197 The Board noted.

Item No.	Particulars				
61.1	Palaeobotany and age determination of sedimentary strata by Shri A. K. Ghosh, Bose Institute, Calcutta. [Shri A. K. Ghosh had written that some work on palaeobotany in relation to age determination of sedimentary strata was being carried out at the Bose Institute, Calcutta since 1949 with a grant-in-aid from the Burma Oil Company. There was no likelihood of the grant being renewed. Shri Ghosh had enquired about the possibility of receiving a grant-in-aid from the C. S. I. R.] The Committee was of the opinion that they had no additional research problem under Palaeobotany which could be entrusted to the Bose Institute and regretted their inability to accept the request.				
62	Subject : Metallurgical research Note : 62.0 The Metals Research Committee (Chairman: Mr. J. J. Ghandy) at its meeting held on January 17, 1955 considered the following research schemes : 62.1 Investigations on the qualitative detection and quantitative determination of rare metals present in coal ash and lignite ash by Prof. V. G. Iyer, Banaras Hindu University, Banaras. [Preliminary investigations on the blast furnace dust utilizing Assam and Hyderabad coals indicated the presence of germanium which is of great value to the electronic industry. It is proposed to extend this work. <table border="0"> <tr> <td>Grant asked for : Equipment : Rs. 7,140</td> <td>Contingencies : Rs. 750</td> </tr> <tr> <td>Staff : Rs. 2,400</td> <td>Total : Rs. 10,290 (including allowances)]</td> </tr> </table> The Committee did not recommend the scheme as there were no suitable facilities for work at the Banaras Hindu University. 62.2 Studies in spectro chemical analysis of aluminium and its alloys including duralumin type alloys by Dr. P. N. Sharma, Lucknow University. [It is proposed to study aluminium and its alloys by spectrochemical methods and	Grant asked for : Equipment : Rs. 7,140	Contingencies : Rs. 750	Staff : Rs. 2,400	Total : Rs. 10,290 (including allowances)]
Grant asked for : Equipment : Rs. 7,140	Contingencies : Rs. 750				
Staff : Rs. 2,400	Total : Rs. 10,290 (including allowances)]				

Recommendations of the Committee of the Board	Recommendations of the Board
61. 1 p. 199 The Committee accepted the opinion of the Research Committee and did not recommend the research scheme 'Age determination by palaeobotanical methods' by Mr. A. K. Ghosh.	61. 1 p. 199 The Board did not recommend the scheme for sanction.
62. 0 p. 199 The Committee noted.	62. 0 p. 199 The Board noted.
62. 1 p. 199 The Committee did not recommend the research scheme on 'Determination of rare metals present in coal ash and lignite ash' by Prof. V. G. Iyer since there were no suitable facilities for the work at the Banaras University.	62. 1 p. 199 The Board did not recommend the scheme for sanction.

Item No.	Particulars
63	utilize the result for the developing aluminium industry in India.
	Grant asked for : Equipment : Rs. 2,000 Contingencies : Rs. 1,000 Staff : Rs. 3,120 Total : Rs. 6,120 (including allowances)]
	The Committee felt that Dr. Sharma should acquaint himself with the work already done in India in order to avoid any duplication and also to draw up a more definite programme for the proposed investigation.
	Subject : Chemical research schemes
	Note : 63.0 The Chemical Research Committee (Chairman : Dr. K. Venkataraman) at its meeting in Bombay on Jan. 3, 1955 considered the following schemes. 63.1 Investigation in the photosynthesis of amino acids from paraformaldehyde and nitrate by Dr. Krishna Bahadur, Allahabad University. [It is proposed to study the mechanism of the reactions taking place in the formation of amino acids in a mixture of paraformaldehyde, ferric chloride, water and potassium nitrate exposed to sun light and to investigate the possibility of using the synthesis for the production of amino acids. Grant asked for : Equipment : Rs. 10,000 Contingencies : Nil Staff : Rs. 5,625 Total : 15,625 (including allowances)] The work is of a preliminary nature. Previous claims on the photosynthesis of amino acids have been proved incorrect. Professor Finch had also reported very unfavourably on the scheme. The Committee did not recommend the scheme for sanction. 63.2 Pilot plant preparation of ethylene oxide and its products and ethylene a mine and its derivatives from alcohol by Dr. D. N. Daruvalla, Shri Ram Institute for Industrial Reseach, Delhi. [The objects of this scheme are : (i) Study of pilot plant manufacture of ethylene oxide from alcohol using a fluidised bed reactor.

Recommendations of the Committee of the Board	Recommendations of the Board
62. 2 p. 199-201 The Committee recommended that Dr. P. N. Sharma be requested to resubmit a scheme after further study of literature and with a more precise programme as suggested by the Research Committee.	62. 2 p. 199-201 The Board endorsed the recommendation of its Committee.
63. 0 p. 201 The Committee noted.	63. 0 p. 201 The Board noted.
63. 1 p. 201 The Committee did not recommend the research scheme on 'Photosynthesis of amino acids from paraformaldehyde and nitrate' by Dr. Krishna Bahadur as the work was still of a preliminary nature. Dr. Krishna Bahadur may be requested to carry out further work on his own and then submit a scheme if the results were promising and assistance was needed.	63. 1 p. 201 The Board endorsed the recommendations of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
	(ii) Preliminary laboratory scale preparation of products of ethylene. (iii) Pilot plant scale studies of poly amino plastics to be taken up at a later stage. Grant asked for : Equipment : Rs. 25,000 Contingencies : Rs. 5,000 Staff Rs. 9,600 Total Rs. 39,600 (including allowances)] A pilot plant for production of ethylene dichloride and ether from alcohol has been fabricated and tried out for several days continuously with a grant from the CSIR. Dr. Daruvalla has submitted a new scheme. The revised scheme could not be circulated to the members since it was received late. Dr. Ghosh suggested that pilot plant work should be done in the National Chemical Laboratory. Dr. Daruvalla referred to the manufacture of ethylene oxide directly from alcohol. The only source of information on the conversion of ethylene to ethylene oxide was patent literature. References to publications on processes for the manufacture of ethylene oxide were available in Kirk-Othmer's Encyclopaedia of Chemical Technology and in the Chemistry of Synthetic Dyes. If Dr. Daruvalla had an entirely new process from alcohol, research on a laboratory scale can be supported. The Committee agreed with this view and the Chairman was asked to communicate further with Dr. Daruvalla on the subject. 63.3 Evaluation of packing materials from indigenous sources for heat generators usable in tonnage oxygen plants by Dr. N. K. Bose, Lecturer, Calcutta University, Calcutta. [The aim of this scheme is to set up an apparatus for testing regenerator packings and to carry out a detailed study of heat transfer, pressure drop characteristics and purification performance of regenerator packings usable in air separation plants to evolve a suitable indigenous materials for heat regeneration in tonnage oxygen plants. Grant asked for : Equipment : Rs. 8,000 Contingencies : Rs. 2,000 Staff : Rs. 4,716 Total Rs. 14,716 (including allowances)]

Recommendations of the Committee of the Board	Recommendations of the Board
63. 2 p. 201-203 The Committee did not recommend the research scheme on 'Preparation of ethylene oxide and its products and ethylene amine and its derivatives from alcohol' by Dr. D. N. Daruvalla. It was, however, recommended that Dr. Daruvalla may discuss the subject further with the Chairman of the Research Committee.	63. 2 p. 201-203 The Board endorsed the recommendations of its Committee.

Item No.	Particulars
	The Committee recommended that the scheme may be referred to the Board of Engineering Research and its views placed before the Chemical Research Committee at its next meeting. Meanwhile, the Chairman should write to Dr. Bose and enquire if the scheme involved the collection of data on packings of aluminium or copper which are at present used or if he intended to investigate new packing materials.
63.4	Studies in oxygen surface complexes on charcoal by Dr. B. R. Puri, Punjab University.
	[It is proposed to investigate in the scheme the exact number, the nature and the composition of the surface oxygen complexes by evacuation of charcoal at different temperatures by careful analysis of the gases evolved and the residues left behind. This will be carried out : (i) by carbonisation at different temperatures, (ii) by allowing charcoal to age in air, (iii) by exposing it to pure oxygen under different pressures and temperatures, and (iv) by treatment with different oxidising agents.]
	Grant asked for : Equipment : Nil Contingencies : Rs. 300 Staff : Rs. 1,475 Total : Rs. 1,775 (including allowances)]
	The Committee was of the view that the choice of charcoal for the study of surface complexes had the great disadvantage that it was a very variable material. The scheme was not recommended.
63.5	Utilisation of spent nickel catalyst with special reference to recovery of nickel, by Prof. G. Gopala Rao, Head of Chemistry Department, Andhra University.
	[The object of the scheme is to work out a process for the recovery of nickel in vanaspati industry and its utilisation.]
	Grant asked for : Equipment : Rs. 6,000 Contingencies : Rs. 2,000 Staff : Rs. 4,294 Total : Rs. 12,294 (including allowances)]
	This was not a problem for research. A firm in Bombay has been recovering nickel from spent catalyst for the last four or five years, and papers on the subject from the Department of Chemical Technology, Bombay, and the National Chemical Laboratory, Poona have been published. The Committee did not recommend the scheme.

<i>Recommendations of the Committee of the Board</i>	<i>Recommendations of the Board</i>
63. 3 p. 203-205 The Committee recommended that the opinion of the Board of Engineering Research be obtained on the Research Scheme on evaluation of packing materials for heat generators and communicated to the Chemical Research Committee for further consideration.	63. 3 p. 203-205 The Board endorsed the recommendation of its Committee.
63. 4 p. 205 The Committee did not recommend the scheme on 'Oxygen surface complexes on chacoal' by Dr. B. R. Puri as charcoal was a variable type of material and was not suitable for study.	63. 4 p. 205 The Board did not recommend the scheme for sanction.
63. 5 p. 205 The Committee did not recommend the scheme on 'Utilisation of spent nickel catalyst with special reference to recovery of nickel' by Prof. G. Gopala Rao as sufficient work had already been done in the subject.	63. 5 p. 205 The Board did not recommend the scheme for sanction.

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Item No.	Particulars
63.6	Manufacture of manganous sulphate from Indian manganese ores and other manganous salts by prof. G. Gopala Rao, Andhra University. [The object of this scheme is to develop a method for the utilisation of Indian low grade manganese ores by converting them into manganous sulphate and other manganese salts. Grant asked for : Equipment : Rs. 5,000 Contingencies : Rs. 3,000 Staff : Rs. 7,502 Total : Rs. 15,502 (including allowances)] Work on the utilization of manganese ores was being carried out at the National Chemical Laboratory, National Metallurgical Laboratory, the Indian Institute of Science and the Electro-Chemical Research Institute, as well as the Department of Chemical Technology, Bombay. The scheme was not recommended for sanction.
63.7	Chemical studies on the quantitative analysis in complicated systems by Dr. A. K. Bhattacharya, Agra College, Agra. [The object of this scheme is to investigate the comparative accuracy of the various techniques followed for the quantitative analysis of complicated systems with special emphasis on physico-chemical methods with a view to devising methods of checking or minimising the effect of interfering phenomena so as to evolve more accurate analytical method for use by industrial and Government institutions. Analytical methods of ores of Fe, Cu, Zn, Cd and Indian monazite sands are proposed to be investigated. Grant asked for : Equipment : Rs. 11,000 Contingencies : Rs. 1,500 Staff : Rs. 2,420 Total : Rs. 14,920 (including allowances)] The view was expressed that the field which Dr. Bhattacharya intended to cover was too general and vague, and the Chairman was asked to communicate with Dr. Bhattacharya and inquire if he could suggest a specific and clearly defined problem.

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Recommendations of the Committee of the Board	Recommendations of the Board
63. 6 p. 207 The Committee did not recommend the research scheme on 'Manufacture of manganous sulphate from Indian manganese ores and other manganous salts' by Prof. G. Gopala Rao as considerable work on utilisation of manganese ores was already under way in a number of research laboratories.	63. 6 p. 207 The Board did not recommend the scheme for sanction.
63. 7 p. 207 The Committee did not recommend the scheme on 'Quantitative analysis in complicated systems' by Dr. A. K. Bhattacharya as the scheme was too vague. Dr. Bhattacharya may, however, be requested to resubmit a scheme dealing with a more specific problem.	63. 7 p. 207 The Board endorsed the recommendations of its Committee.

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Item No.	Particulars
64	Subject :- Vegetable oils research schemes Note : 64.0 The Vegetable Oils Research Committee (Chairman : Prof. T.R. Seshadri) considered the following new research schemes. 64.1 (a) Activation of bauxite and (b) activation of Hyderabad earths by Dr. S. A. Saletore, C. L. S. & I. R., Hyderabad (Dn). [It is proposed to carry out on pilot plant scale, activation of bauxite and Hyderabad earths, on the basis of processes developed in an earlier scheme for which three patents were also taken. Grant asked for : Equipment : Rs. 60,000 Contingencies : Rs. 13,440 Staff : Rs. 12,960 Total : Rs. 86,400 (including allowances)] The schemes were considered in detail but were not recommended. 64.2 Constitutive studies of unsaturated glycerides by Dr. M. M. Chakravarti, Calcutta. [The object of this scheme is isolation of concentrates of di and tri-unsaturated glycerides, in pure condition by low temperature crystallization and studying the mutual solubility effects of these upon one another, and comparison of the drying properties of the synthetic di and tri-unsaturated glycerides. Grant asked for : Equipment : Nil Contingencies : Rs. 1,940 Staff : Rs. 3,570 Total : Rs. 5,510 (including allowances)] The Committee did not consider the present programme to be of either theoretical or practical interest. There is no element of novelty about the procedure of the material. It was suggested that the author might send a new scheme for consideration bearing in mind these points. The Chairman was also requested to take action on any new scheme submitted by Dr. Chakravarti, by circulation. 64.3 Recovery, utilisation and chemical study of fish (fresh water and marine) oil with a view to harnessing the waste of the fishing industry and finding a suitable avenue for its use by Dr. S. P. Pathak, Banara. [This scheme aims at the recovery, utilization and chemical study of fish oils especially from the wastes of the fishing industry. Grant asked for : Equipment : Rs. 2,000 Contingencies : Rs. 1,000 Staff : Rs. 6,840 Total : Rs. 9,840 (including allowances)]

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Recommendations of the Committee of the Board	Recommendations of the Board
64.0 p. 209 The Committee noted. 64.1 p. 209 The Committee did not recommend the research scheme on 'Pilot plant activation of bauxite and activation of Hyderabad earths' by Dr. S. A. Saletore. 64.2 p. 209. The Committee did not recommend the research scheme on 'Unsaturated glycerides' by Dr. M. M. Chakravarti in its present form but recommended that he may be requested to put up a revised scheme on the lines suggested by the Research Committee.	64.0 p. 209 The Board noted. 64.1 p. 209 The Board did not recommend the scheme for sanction. 64.2 p. 209 The Board endorsed the recommendations of its Committee.

Item No.	Particulars
	The scope of the scheme was not clear. Regarding the development of industrial aspect of fish oil, reference may be made to the Fisheries Department for information. Dr. Pathak may also be asked to explain clearly what materials (with their quantities) will be available for industrial development and the lines he proposed to pursue. The Committee postponed consideration.
65	Subject : Internal combustion engines research schemes Note : 65.0 The Internal Combustion Engines Research Committee (Chairman: Dr. J. C. Ghosh) considered the following new schemes of research at its meeting held on January 2, 1955 : 65.1 Development of multipurpose 2-stroke engine with variable compression ratio by Prof. Miapl. Ing. O. Scholze, Madras Institute of Technology. [Under this scheme it is proposed to develop a multipurpose 2-stroke engine of small horse power with variable compression ratio, suitable for a wide range of fuels so that it can be conveniently used for small scale operations like water pumping for agriculture, motor rickshaws, small scale industrial units etc. Grant asked for : Equipment : Rs. 5,000 Contingencies : Rs. 20,000 Staff : Rs. 5,000 Total : Rs. 30,000 (including allowances)] Dr. Ghatage said that the design appeared to have possibilities in stationary plants, especially for compressors. Prof. Havemann was of the opinion that the principle of variable compression was more suited to Otto engines than Diesel engines. Shri Bhalla opined that the design would have value in high altitude application as there would be no loss of power. The Committee felt that for deciding the magnitude of funds to be provided, more details regarding the scheme should be made available. The Chairman stated that it should be ascertained whether definite results would be forthcoming within a period of three years. The Committee decided that Shri G. R. Damodaran should discuss the scheme with the investigator and forward a report to the Chairman so that suitable recommendations may be made to the B. S. I. R. 65.2 Improvement in the combustion of low grade solid fuels in stationary industrial boiler furnaces by Prof. S. B. Sen of the Indian Institute of Technology, Kharagpur.

Recommendations of the Committee of the Board	Recommendations of the Board
64, 3 p. 209-211 The Committee recommended that Dr. S. P. Pathak be requested to clarify the points raised by the Research Committee for further consideration.	64, 3 p. 209-211 The Board endorsed the recommendation of its Committee.
65, 0 p. 211 The Committee noted.	65, 0 p. 211 The Board noted.
65, 1 p. 211 The Committee endorsed the recommendation of the Research Committee that Prof. Scholze and Mr. G. R. Damodaran may discuss the details of the scheme on Development of multipurpose 2-stroke engine with variable compression ratio and the scheme be again placed before the Research Committee as the sum involved was large.	65, 1 p. 211 The Board endorsed the recommendation of the Research Committee.

Item No.	Particulars
	The Committee was of the opinion that the subject pertained to fuels rather than to internal combustion engines, and recommended that the scheme be placed before the Fuel Research Committee for consideration. 65.3 Improvement in diesel engines by Shri S. N. Bhandari. [Under this scheme the investigator proposes to replace the fuel injection system in the diesel engine by a 'pressure carburator' developed by the investigator. Grant asked for : Equipment : Rs. 30,000 Contingencies : Rs. 43,000 Staff Rs. 11,940 Total : Rs. 84,940 (including allowances)] Dr. S. R. Sen Gupta had a personal discussion with Shri S. N. Bhandari and had found that the idea put forward by him was not worth pursuing as it was going to be neither economical nor efficient. The Committee did not recommend the scheme. 65.4 Investigation of automobile engines using alcoholic mixtures in the tropics by Dr. D. L. Deshpande, Bihar Institute of Technology, Sindri. [Under this scheme it is proposed to substitute petrol by alcohol as fuel for internal combustion engines and study various factors like energy content charts, startability, efficiency of combustion, road requirements, wear corrosion, crank case dilution, economics etc. Grant asked for : Equipment : Rs. 13,000 Contingencies : Rs. 12,500 Staff : Rs. 7,000 Total : Rs. 32,500 (including allowances)] Since the proposal entailed duplication of work that had been done or was being done in several other institutions such as the Indian Institute of Science, Bangalore, the Bengal Engineering College, Howrah, the Victoria Jubilee Technological Institute, Bombay, etc., the Committee did not recommend the scheme.
66	Subject : Pharmaceuticals and drugs research schemes Note : 66.0 The Pharmaceuticals & Drugs Research Committee (Chairman : Maj. Gen. S. S. Sokhey) in its meeting held on the 6th February, 1955 considered the following new schemes :-

Recommendations of the Committee of the Board	Recommendations of the Board
65. 2 p. 211-213 The Committee noted that the research scheme had since been referred to the Fuel Research Committee for opinion.	65. 2 p. 211-213 The Board noted.
65. 3 p. 213 The Committee did not recommend the scheme on 'Diesel Engines' by Shri S. N. Bhandari as it was not worth pursuing.	65. 3 p. 213 The Board did not recommend the scheme for sanction.
65. 4 p. 213 The Committee did not recommend the scheme on 'automobile engines using alcoholic mixtures in the tropics' by Dr. Deshpande as similar work was already underway in a number of institutions.	65. 4 p. 213. The Board did not recommend the scheme for sanction.
66. 0 p. 213 The Committee noted.	66. 0 p. 213 The Board noted.

Item No.	Particulars
66.1	Study of the composition of the active principles of Indian medicinal plants and attempt to prepare synthetic drugs by Dr. K. K. Baslas, Agra [The object of this scheme is to carry out an examination of Indian medicinal plants of known medicinal value in indigenous system of medicine but not investigated; isolation of active principles ; study of their chemistry, their synthesis and investigation of their pharmacological action. Separation and chemical structure of other components of these plants, will also be undertaken.] Grant asked for : Equipment : Rs. 2,400 Contingencies : Rs. 1,000 Staff : Rs. 2,420 Total: Rs. 5,820 (including allowances)] The Committee felt that the scheme was vague. Schemes on medicinal plants were already being sponsored by the C. S. I. R.
66.2	A study of some ephedrine synthesis and adoption of one of these for chemical manufacture by Dr. S. H. Zaheer, Hyderabad (Dn) [The object of this scheme is a laboratory study of some of the known processes of ephedrine synthesis on pilot plant and investigation with a view to commercial production of the most successful process.] Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : 6,060 Total : Rs. 7060 (including allowances)] The Committee felt that ephedrine could be easily extracted from Ephedra. Besides, synthetic ephedrine is understood to be more expensive. The scheme was therefore not recommended.
66.3	A study of synthetic methods for the manufacture of stilboestrol and adaptation of a suitable one for commercial exploitation by Dr. S. H. Zaheer, Hyderabad (Dn) [The object of this scheme is to undertake laboratory scale investigation of the

<i>Recommendations of the Committee of the Board</i>	<i>Recommendations of the Board</i>
66. 1 p. 215 The Committee did not recommend the research scheme on 'Active principles of Indian medicinal plants' by Dr. K. K. Baslas as the scheme was vague and similar work was under-way in a number of laboratories.	66. 1 p. 215 The Board did not recommend the scheme for sanction.
66. 2 p. 215 The Committee did not recommend the research scheme on 'Ephedrine synthesis' by Dr. S. H. Zaheer as ephedrine could easily be obtained from Ephedra and synthetic ephedrine was more expensive.	66. 2 p. 215 The Board did not recommend the scheme for sanction.

Item No.	Particulars
	available processes of commercial synthesis of stilboestrol and adaptation of a suitable one for pilot plant experimentation and subsequent commercial manufacture.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 6,060 Total : Rs. 7,060 (including allowances)]
	The Committee felt that at this stage there was not enough demand for stilboestrol in the country. The scheme was, therefore, not recommended.
66.4	Laboratory and pilot plant scale synthesis of pethidine by Dr. S. H. Zaheer, Hyderabad (Dn)
	[The object of this scheme is to prepare pethidine by the five well known routes depending on the condensations with acetonitriles under the influence of soda amide.
	The routes found suitable will also be investigated on pilot plant scale.
	At a later stage the preparation of the starting materials (i) sodium amide, (ii) phenyl acetonitrile, (ii) dimethyl chloroethylamine, and (iv) ethyl bromoethyl will also be investigated.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 6,060 Total : Rs. 7,060 (including allowances)]
	The Committee recommended that Dr. Zaheer and Dr. Hamied may be asked to give an approximate costing of the production of pethidine and also indicate the availability of the raw materials. The reports would be considered in the next meeting of the Committee.
66.5	Synthesis of vanitrope by Dr. S. H. Zaheer, Hyderabad (Dn)
	[The object of this scheme is to investigate the synthesis of vanitrope starting

Recommendations of the Committee of the Board	Recommendations of the Board
66. 3 p. 215-217 The Committee did not recommend the research scheme on 'Manufacture of stilboestrol' as there was not enough demand for this drug in the country.	66. 3 p. 215-217 The Board did not recommend the scheme for sanction.
66. 4 p. 217 The Committee recommended that Dr. Zaheer and Dr. Hamied be requested to furnish the information required by the Research Committee in regard to cost of production of pethidine and indicate the availability of raw materials for consideration by the Research Committee at its next meeting.	66. 4 p. 217 The Board endorsed the recommendation of its Committee.

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Item No.	Particulars
	with (a) hydroxy benzaldehyde and (b) saffrola on a laboratory scale, followed by pilot plant trials of the successful method.
	Grant asked for : Equipment : Rs. 1,000 Contingencies : Rs. 1,000 Staff : Rs. 4,800 Total : Rs. 6,800 (including allowances)]
	The Committee felt that this scheme should be referred to the Essential Oils Research Committee.
66.6	A study of methods of preparation of methyl dihydromorphinine (Metopon) on laboratory and pilot plant scale by Dr. S. H. Zaheer, Hyderabad (Dn)
	[The object of the scheme is to carry out the synthesis of Metopon from morphine and thebaine on a laboratory scale and subsequently on pilot plant scale.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 6,060 Total : Rs. 7,060 (including allowances)]
	The drug was not of much value at present and hence the scheme was not recommended.
66.7	Antiviral studies on chemotherapeutic agents of indigenous origin both natural and synthetic by Dr. H. I. Jhala, Bombay
	[The object of the proposed scheme is to carry out studies on the antiviral aspect of indigenous antibacterial substances of plant origin as well as those prepared synthetically.
	Grant asked for : Equipment : Rs. 8,000 Contingencies : Rs. 4,000 Staff : Rs. 5,041 Total : Rs. 17,041 (including allowances)]
	The Committee felt that the scheme was indefinite and did not recommended it for sanction.
66.8	Studies in the inter-relationship between antibiotics and vitamin B ₁₂ with reference to their action as growth stimulators by Dr. P. N. Nandi, Calcutta
	[Grant asked for : Equipment : Rs. 4,000 Contingencies : Rs. 3,000 Staff : Rs. 6,120 Total : Rs. 13,120 (including allowances)]

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Recommendations of the Committee of the Board	Recommendations of the Board
66. 5 p. 217-219 The Committee noted that the research scheme had since been referred to the Essential Oils Research Committee.	66. 5 p. 217-219 The Board noted.
66. 6 p. 219 The Committee did not recommend the research scheme on 'Preparation of methyl dihydromorphinine' by Dr. Zaheer as the drug was not of much value now.	66. 6 p. 219 The Board did not recommend the scheme for sanction.
66. 7 p. 219 The Committee did not recommend the research scheme on 'Antiviral studies on chemotherapeutic agents of indigenous origin' by Dr. H. I. Jhala as the scheme was considered vague.	66. 7 p. 219 The Board did not recommend the scheme for sanction.

Item No.	Particulars
	The Committee endorsed the opinion of the Biochemical Research Committee that the scheme was too vague and therefore could not be recommended (vide item no. 67.2 p. 223 of this agenda)
66.9	Survey of medicinal plants of Hyderabad by Dr. S. H. Zaheer, Hyderabad (Dn) [The object of this scheme is to carry out a systematic and region wise survey of the medicinal plants of Hyderabad with reference to occurrence and their availability for commercial utilisation. The scheme also envisages the collection of samples and cultivation of suitable plants. Grant asked for : Equipment : Rs. 2,000 Contingencies : Rs. 2,000 Staff : Rs. 11,000 Total : Rs. 15,000 (including allowances)] The Committee noted that this work was already being done by the National Botanical Garden, Lucknow, and hence the scheme was not recommended.
66.10	Studies in thiazole derivatives : Dr. K. S. Narang, Hoshiarpur. [The object of this scheme is to carry out a synthesis of (i) 2-hydroxy, 2-chloro and 3-bromo thiazoles and (ii) three other thiazole derivatives and test their antibiotic action. Grant asked for : Equipment : Rs. 2,000 Contingencies : Rs. 5,000 Staff : Rs. 7,062 Total : Rs. 14,062 (including allowances)] The Committee noted that Dr. Narang had already been sanctioned a scheme under the Chemical Research Committee. This scheme was not recommended.
66.11	Fundamental research on the toxicity and mode of action of insecticides : Dr. H. S. Pruthi, Hoshiarpur. [The object of this scheme is to carry out detailed fundamental researches on the reactions of Indian insects to various insecticides, imported and indigenous synthetical and of plant origin (pyrethrum, derris, nicotine, etc.) Grant asked for : Equipment : Rs. 8,000 Contingencies : Rs. 4,000 Staff : Rs. 25,860 Total : Rs. 37,860 (including allowances)] The scheme was referred to the Indian Council of Agricultural Research.

<i>Recommendations of the Committee of the Board</i>	<i>Recommendations of the Board</i>
66, 8 p. 219-221 The Committee did not recommend the research scheme on 'Inter-relationship between antibiotics and vitamin B 12' by Dr. P. N. Nandi as the scheme was considered vague.	66, 8 p. 219-221 The Board did not recommend the scheme for sanction.
66, 9 p. 221 The Committee did not recommend the scheme on 'Survey of medicinal plants of Hyderabad State' as this would be taken up by the National Botanical Garden.	66, 9 p. 221 The Board did not recommend the scheme for sanction.
66, 10 p. 221 The Committee did not recommend the research scheme on 'Thiazole derivatives' by Dr. Narang as he had already taken up a similar scheme and he may concentrate on that.	66, 10 p. 221 The Board did not recommend the scheme for sanction.
66, 11 p. 221 The Committee recommended that the research scheme on 'Toxicity and mode of action of insecticides' by Dr. H. S. Pruthi be referred to the Indian Council of Agricultural Research.	66, 11 p. 221 The Board endorsed the recommendation of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
67	Subject : Biochemical research schemes Note : 67.0 The following schemes were discussed by the Biochemical Research Committee (Chairman : Dr. V. Subrahmanyam) at its meeting held on January 3, 1953 and recommendations were made. 67.1 Studies on vitamin A esterase by Dr. J. Ganguly, Lecturer, Biochemistry Department, Indian Institute of Science, Bangalore. [Under this scheme it is proposed to carry out a detailed investigation on the distribution of vitamin A esterase in animal tissue, its preparation in pure state and a study of its physico-chemical properties particularly specificity. Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 6,672 Total : Rs. 7,672 (including allowances) The scheme was originally recommended for sanction. The Chairman later learned that the investigator had submitted another scheme on a closely allied subject to the Indian Council of Medical Research. The Chairman therefore referred both the scheme to the Biochemical Research Committee for examining the possibilities of overlapping. The Chairman has since informed that the Committee does not recommend the scheme for sanction. 67.2 Studies on the inter-relationship between antibiotics and vitamin B₁₂ with reference to their action as growth stimulators by Dr. P. N. Nandi, Calcutta. [Recent application of antibiotics as growth stimulators has indicated the possibility of some inter-relationship between antibiotics and vitamin B₁₂. Under the scheme it is proposed to investigate the subject in detail so as to understand the mechanism and factors involved. Grant asked for : Equipment : Rs. 4,000 Contingencies : Rs. 3,000 Staff : Rs. 6,120 Total: Rs. 13,120 (including allowances) Dr. D. L. Shrivastava pointed out that the scheme was also submitted for consideration by the Pharmaceuticals and Drugs Research Committee of the Council (vide item 66, 8 p. 219-221 of this agenda). The Committee, however, felt that the scheme as now submitted was rather very comprehensive and the investigator was advised to submit a fresh scheme on any specific aspect of the problem.

Recommendations of the Committee of the Board	Recommendations of the Board
67. 0 p. 223 The Committee noted. 67. 1 p. 223 The Committee did not recommend the scheme on vitamin A esterase by Dr. J. Ganguly as he had already submitted a similar scheme to the Indian Council of Medical Research. 67. 2 p. 223 The Committee noted that the research scheme had already been considered under Item 66, 8 p. 219-221 of this agenda.	67. 0 p. 223 The Board noted. 67. 1 p. 223 The Board did not recommend the scheme for sanction. 67. 2 p. 223 The Board noted.

RESEARCH SCHEMES

Item No.	Particulars
	The Committee was of the opinion that the work proposed amounts to re-doing a large section of microbiology. Such a work involved several years of study and should be a normal function of a microbiological laboratory. The Committee had already sanctioned one scheme entitled antifungal antibiotics produced by bacteria to the investigator and felt that he should concentrate, for the present, on the said scheme. The Committee therefore did not recommend the scheme.
67.6	Nutritive value of canned fish by Dr. N. G. Magar, Bombay. [Under this scheme it is proposed to (1) select a proper fish for canning, (2) study the maximum bacterial load in different seasons and from different places, (3) study the effect of storage on nutritive value of canned fish, and (4) study the effect of antioxidants and synergists in canning of fish.] Grant asked for : Equipment : Nil Contingencies : Rs. 800 Staff : Rs. 3,060 Total : Rs. 3,860 (including allowances)]
	The Committee did not recommend the scheme as submitted, but desired that the investigator may be advised that after he had completed the studies relating to (1) and (2) he may submit a fresh scheme for investigating only the nutritive value and the storage properties of canned fish.
68	Subject : Plastics research schemes Note: 68.0 The Plastics Research Committee (Chairman : Dr. L. C. Verman) in its meeting held on the 28th January, 1955 considered the following new research schemes. 68.1 Preparation of improved thermosetting resins by Dr. D. N. Daruvalla, Shri Ram Institute for Industrial Research, Delhi. [The object of this scheme is to study the preparation of thermosetting materials from Indian raw materials (CNSI, BSL and indigenous phenols) on pilot plant scale. Grant asked for: Equipment : Nil Contingencies : Rs. 3,500 Staff : Rs. 3,000 Total : Rs. 6,500 (including allowances)]

<i>Recommendations of the Committee of the Board</i>	<i>Recommendations of the Board</i>
67. 5 p. 225-227 The Committee did not recommend the scheme on 'Microbial culture' by Dr. S.K. Bose as the scheme was too ambitious and as Dr. Bose had already a scheme under his direction on which he may concentrate his attention.	67. 5 p. 225-227 The Board did not recommend the scheme for sanction.
67. 6 p. 227 The Committee did not recommend the scheme on 'Nutritive value of canned fish' by Dr. N. G. Magar in its present form. It was further recommended that Dr. Magar be requested to carry out further studies on canning and submit a fresh scheme dealing with nutritive and storage aspects only.	67. 6 p. 227 The Board endorsed the recommendations of its Committee.
68. 0 p. 227 The Committee noted.	68. 0 p. 227 The Board noted.

Item No.	Particulars
	The Committee did not recommend the scheme as neither cashew nut shell liquid nor bhilawan shell liquid had proved satisfactory for the preparation of thermosetting resins. 68.2 Deposition of metals on plastics by Dr. D. N. Daruvalla, Shri Ram Institute for Industrial Research, Delhi. [The object of this scheme is to design, develop and fabricate high vacuum metallising unit for deposition of metals on plastics and to establish optimum conditions of working. A study of the physico-chemical phenomena involved is also proposed to be carried out. Grant asked for : Equipment : Rs. 14,000 Contingencies : Rs. 1,000 Staff : Rs. 3,500 Total : 18,500 (including allowances)] The Committee did not recommend the scheme as there was little market for metallised plastics and a firm in Calcutta having the equipment could not utilise it. 68.3 Study of branching in polyvinyl acetate polymers by Dr. G. S. Misra, Lecturer in Chemistry, Lucknow University. [The object of this scheme is to carry out a determination of the exact number of branches present in pure fractioned vinyl high polymer (polyvinyl acetate) by measuring the size of the molecules using the recently developed light scattering technique. Grant asked for : Equipment : Rs. 10,000 Contingencies : Nil Staff : Rs. 2,695 Total : 12,695 (including allowances)] The Committee did not recommend the scheme as it was vague. The Committee also wanted information as to the exact nature of work and as to how the exact number of branches could be determined from the data obtainable by the light scattering equipment. 68.4 Utilisation of coal tar fractions for the preparation of resins, by Mr. P. Bagchi, Research Officer, Dept. of Organic Chemistry, Indian Association for the Cultivation of Science, Calcutta. [The object of this scheme is to evolve efficient and economic methods for the

Recommendations of the Committee of the Board	Recommendations of the Board
68. 1 p. 227-229 The Committee did not recommend the research scheme on 'Thermosetting resins from cashew nut shell liquid and similar materials' as these materials had proved unsatisfactory for the purpose.	68. 1 p. 227-229 The Board did not recommend the scheme for sanction.
68. 2 p. 229 The Committee did not recommend the scheme on 'Deposition of metals on plastics' by Dr. D.N. Daruvalla as there was no demand for such products.	68. 2 p. 229 The Board did not recommend the scheme for sanction.
68. 3 p. 229 The Committee did not recommend the scheme on 'Branching in polyvinyl acetate polymers' Dr. G. S. Misra as it was considered vague. Dr. Misra could be requested to provide more information as desired by the Research Committee.	68. 3 p. 229 The Board endorsed the recommendations of its Committee.

RESEARCH SCHEMES

Item No.	Particulars
69	preparation of different grades of coumarane-indene resins including the hydrogenated types from tar fractions.
	Grant asked for : Equipment : Rs. 1,000 Contingencies : Rs. 1,500 Staff : Rs. 4,020 Total : 6,520 (including allowances)]
	The Committee did not recommend the scheme and further desired that the proposer may resubmit the scheme in the light of the work already done at the Fuel Research Institute, Jealgora.
	Subject : Cellulose reesarch scheme
	Note :
	69.0 The Cellulose Research Committee (Chairman : Dr. B. K. Vaidya) considered the following proposal at its meeting held on January 3, 1955 :
	69.1 Utilization of unsaleable cotton wastes from the textile industry by Dr. P. C. Mehta, Assistant Director, Ahmedabad Textile Research Association, Ahmedabad.
	[In textile manufacture, when cotton bales are cleaned in the blow room, 5-10% of total cotton processed is lost along with the trash. Out of this amount approximately 1.5 to 2 % contains a fairly high proportion of cotton fibres. Under this scheme it is proposed to examine the possibilities of utilizing blow room waste containing 60-7% trash.
	Grant asked for : Equipment : Rs. 3,200 Contingencies : Rs. 1,000 Staff : Rs. 3,570 Total : Rs. 7,770 (including allowances)]
	A sample of the type of cotton waste which was meant to be utilised for the work was shown to the Committee. The Indian Central Cotton Committee Laboratories have also worked on this type of problem utilising for the purpose, linters from cotton seeds as well as some mill waste. In their opinion the blow room waste which was exhibited was extremely difficult to work for the 10 to 15% cellulose fibres it contained. However, if Dr. Mehta could show that the extraneous non-fibrous material could be satisfactorily removed from the fibres, the proposed scheme may be taken up. The Committee therefore suggested that Dr. Mehta may be informed accordingly.

Recommendations of the Committee of the Board	Recommendations of the Board
68. 4 p. 229-231 The Committee did not recommend the research scheme on 'Utilisation of coal tar fractions for the preparation of resins' by Mr. P. Bagchi in its present form. It was recommended that he may be requested to re-submit the scheme after taking into account the work already done at the Fuel Research Institute.	68. 4 p. 229-231 The Board endorsed the recommendations of its Committee.
69. 0 p. 231 The Committee noted.	69. 0 p. 231 The Board noted.
69. 1 p. 231 The Committee noted.	69. 1 p. 231 The Board noted.

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Item No.	Particulars
70	Subject : Building research scheme <i>Note :</i> 70.0 The Building Research Committee (Chairman : Maj. Gen. H. Williams) at its meeting held on Jan. 5, 1955 considered the following research scheme. 70.1 Continuity of prestressed concrete composite structures by Mr. K. K. Banerjee, Lecturer, Bengal Engineering College, Howrah. [The object of this scheme is to study the behaviour of composite structures when made continuous, with particular reference to the floor unit designed by the author. Grant asked for : Equipment : Rs. 2,000 Contingencies : Rs. 3,000 Staff : Rs. 2,038 Total : 7,038 (including allowances)] The Committee felt that the scheme as furnished by Mr. K. K. Banerjee was lacking in detail, and recommended that the author be requested to submit a fuller report from studies on the subject ; including foreign literature, and to describe more specifically the scheme he proposed to undertake, for the consideration of the Committee at its next meeting.
71	Subject : Research schemes received late <i>Note :</i> 71.0 The following new schemes of research were received late and have been circulated to the Research Committees concerned for consideration. The opinion of the Research Committees is awaited. 71.1 Study of moisture balance problems in micrometeorology by Mr. V. P. Subrahmanyam, Lecturer, Dept. of Geophysics, Andhra University. [The object of this scheme is to develop a suitable portable equipment for micro meteorological investigations with particular reference to the study of moisture balance both by direct and indirect methods. Grant asked for : Equipment : Rs. 500 Contingencies : Rs. 500 Staff : Rs. 5,885 Total : Rs. 6,885 (including allowances)]

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Recommendations of the Committee of the Board	Recommendations of the Board
70. 0 p. 233 The Committee noted. 70. 1 p. 233 The Committee recommended that Mr. K.K. Banerjee be requested to submit fuller details as desired by the Research Committee for consideration at its next meeting.	70. 0 p. 233 The Board noted. 70. 1 p. 233 The Board endorsed the recommendation of its Committee.

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Item No.	Particulars
	The scheme has been referred to the Atmospheric Research Committee for opinion. 71.2 Use of plastic theory for the design of statically determinate and indeterminate steel structure by Mr. S. C. Goyal, Professor of Structural Engineering, M. B. M. Engineering College, Jodhpur. [The object of this scheme is the application of plastic theory in the design of steel structures particularly intermediate frames used in multi-storied buildings, transmission and radio towers, portals etc. with a view to effecting economy. Grant asked for : Equipment : Rs. 10,000 Contingencies : Rs. 1,000 Staff : Rs. 2,420 Total : Rs. 13,420 (including allowances)] The scheme has been referred to the Building Research Committee. 71.3 Utilisation of South Arcot lignite for reducing Salem iron ores by Dr. C. V. S. Ratnam, Senior Chemist & Member, Committee of Experts, Lignite Investigation, Government of Madras, Nayvelli, South Arcot, Madras. [The object of this scheme is the utilisation of lignite resources of Neyvelli (South Arcot) for making iron and steel from ores of Salem District, using low shaft furnace. Grant asked for : Equipment : Rs. 15,450 Contingencies : Rs. 4,500. Staff : Rs. 11,121 Total : Rs. 31,071 (including allowances)] The scheme has been referred to the Metals Research Committee for opinion. 71.4 Radio active determination of Indian rocks by Dr. V. S. Dubey, Professor of Economic Geology, Banaras Hindu University. [The object of this scheme is to carry out a determination of the radio active contents, uranium and thorium, of Indian rocks (igneous and sedimentary) and the ages of Indian rocks by lead and helium methods. Grant asked for : Equipment : Rs. 50,000 Contingencies : Rs. 6,500 Staff : Rs. 4,840 Total : Rs. 61,340 (including allowances)]

Recommendations of the Committee of the Board	Recommendations of the Board
71. 1, 71.2 and 71.3 p. 233-235 The Committee noted that the research schemes had been received late and referred to the concerned Research Committees for opinion which had not yet been received. It was recommended that the research schemes be brought up before the next meeting of the B.S.I.R. along with the opinion of the Research Committees.	71. 1, 71.2 & 71.3 p. 233-235 The Board noted and endorsed the recommendation of its Committee.

Item No.	Particurs
	The scheme has been referred to the Committee for Measurement of Geological Time in India for opinion. 71.5 Chemistry of germanium compounds with special reference to the fluorimetric detection and determination of germanium by Dr. G. Gopal Rao, Head of the Chemistry Department, Andhra University, Waltair. [The object of this scheme is to carry out a detailed study of the chemistry of germanium compounds. Fluorimetric detection and determination of germanium will receive special attention. Grant asked for : Equipment : Nil Contingencies : Rs. 2,000 Staff : Rs. 6,930 Total : Rs. 8,930 (including allowances)] The scheme has been referred to the Chemical Research Committee for opinion. 71.6 Fundamental studies on certain cellulosic fibers by Mr. P. Bagchi, Research Officer, Indian Association for the Cultivation of Science, Calcutta. [It is proposed to carry out a complete evaluation of the macro-molecular properties of <i>Bombax malabarica</i> fibers. Heterogenous hydrolysis and estimation of relative proportion of crystallites and amorphous portions will also be studied. Grant asked for : Equipment : Rs. 1,000 Contingencies : Rs. 1,500 Staff : Rs. 4,930 Total : Rs. 7,430 (including allowances)] The scheme has been referred to the Cellulose Research Committee for opinion. 71.7 Studies on the mechanism of coke formation by Dr. P. L. Agrawal, Lecturer in Fuel Technology, College of Mining and Metallurgy, Banaras Hindu University, Banaras. [The object of this scheme is to carry out a study of the physical structure of Indian coals by gas adsorption technique with a view to elucidating the mechanism of coke formation leading to utilisation of poor caking coals for making metallurgical grade coke. Grant asked for : Equipment : Rs. 7,600 Contingencies : Rs. 2,720 Staff : Rs. 5,192 Total Rs 15,512 (including allowances)] The scheme has been referred to the Fuel Research Committee for opinion.

Recommendations of the Committee of the Board	Recommendations of the Board
71. 4 p. 235-237 The Committee noted that opinion of the Research Committee had since been received, according to which the work proposed in the scheme had already been carried out and would be superfluous. The Committee therefore, did not recommend the scheme on radio active determination of Indian rocks by Dr. V.S. Dubey for a grant-in-aid.	71. 4 p. 235-237 The Board noted and did not recommend the scheme for sanction.

Item No.	Particulars
	71.8 Manufacture of active-carbon from Indian lignites by Dr. P. L. Agrawal, Lecturer in Fuel Technology, Banaras Hindu University. [The object of this scheme is the preparation of activated carbon from South Arcot or Palana lignite and to examine its absorptive capacity and suitability for reduction of H₂S and other sulphur compounds from synthesis gas. Grant asked for: Equipment : Rs. 3,300 Contingencies : Rs. 1,440 Staff : Rs. 4,752 Total Rs. 9,492 (including allowances)] The scheme has been referred to the Fuel Research Committee for opinion. 71.9 Fluidised gasification of South Arcot lignites by Dr. P. L. Agrawal, Lecturer in Fuel Technology, Banaras Hindu University. [The object of the scheme is to carry out investigation on the gasification of South Arcot lignite in a fluidised bed with the object of developing a method of obtaining water gas suitable as fuel or for use as synthesis gas. The laboratory scale work is proposed to be taken up first and then followed by pilot plant scale experiments after experience has been gained. Grant asked for : Equipment : Rs. 4,000 Contingencies Rs. 1,240 Staff : Rs. 3,707 Total Rs. 8,947 (including allowances)] The scheme has been referred to the Fuel Research Committee for opinion. 72.10 Differential thermal analysis of coal by Dr. P. L. Agrawal, Lecturer in Fuel Technology, College of Mining and Metallurgy, Banaras Hindu University. [The object of the scheme is to carry out determination of the exothermic heat generation and the endothermic heat absorption on heating Indian coals under controlled conditions. The data is expected to provide valuable information regarding the coking characteristics of Indian coals. Grant asked for : Equipment : Rs. 4,950 Contingencies Rs. 490 Staff : Rs. 4,752 Total Rs. 10,192 (including allowances)] The scheme has been referred to the Fuel Research Committee for opinion.
72	Subject : Physical research schemes (renewals) Note : 72.0 The Physical Research Committee at its meeting held on February 3, 1955 considered the renewal applications of the following schemes and recommended their continuance during the year 1955-56.

Recommendations of the Committee of the Board	Recommendations of the Board
71.5, 71.6, 71.7, 71.8, 71.9 and 71.10 p. 237-239 The Committee noted that opinion of the Research Committees on these schemes had not been received. It was recommended that the schemes be brought up before the B.S.I.R. at the next meeting along with the opinion of the Research Committees. 72. 0 p. 239 The Committee noted.	71. 5, 71.6, 71.7, 71.8, 71.9 and 71.10 p. 237-239 The Board noted and endorsed the recommendation of its Committee. 72. 0 p. 239 The Board noted.

Item No.	Particulars								
72.1	Some aspects of oceanographic research by Prof. C. Mahadevan, Andhra University Grant asked for : Equipment : Rs. 4,000 Contingencies : Rs. 1,500 Staff : Rs. 3,850 Total Rs. 9,350 (including allowances) The Committee considered the progress satisfactory and recommended the following grant : <table style="width: 100%; margin-left: 40px;"> <tr> <td>Equipment</td><td style="text-align: right;">... Rs. 4,000</td></tr> <tr> <td>Contingencies</td><td style="text-align: right;">... Rs. 1,500</td></tr> <tr> <td>Staff : (2 Senior Lab. Assistants)</td><td style="text-align: right;">... Rs. 3,785 (including allowances)</td></tr> <tr> <td></td><td style="text-align: right; border-top: 1px solid black;"><u>Total Rs. 9,285 (including allowances)</u></td></tr> </table>	Equipment	... Rs. 4,000	Contingencies	... Rs. 1,500	Staff : (2 Senior Lab. Assistants)	... Rs. 3,785 (including allowances)		<u>Total Rs. 9,285 (including allowances)</u>
Equipment	... Rs. 4,000								
Contingencies	... Rs. 1,500								
Staff : (2 Senior Lab. Assistants)	... Rs. 3,785 (including allowances)								
	<u>Total Rs. 9,285 (including allowances)</u>								
72.2	Use of photomultiplier tubes in the measurement of feeble X-ray intensity by Prof. Banerji, University of Allahabad. Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 3,348 Total : Rs. 4,348 (including allowances) The scheme was recommended with the following grant : <table style="width: 100%; margin-left: 40px;"> <tr> <td>Equipment</td><td style="text-align: right;">... Nil</td></tr> <tr> <td>Contingencies</td><td style="text-align: right;">... Rs. 1,000</td></tr> <tr> <td>Staff : (1 J.R.A.)</td><td style="text-align: right;">... Rs. 3,348 (including allowances)</td></tr> <tr> <td></td><td style="text-align: right; border-top: 1px solid black;"><u>Total Rs. 4,348 (including allowances)</u></td></tr> </table>	Equipment	... Nil	Contingencies	... Rs. 1,000	Staff : (1 J.R.A.)	... Rs. 3,348 (including allowances)		<u>Total Rs. 4,348 (including allowances)</u>
Equipment	... Nil								
Contingencies	... Rs. 1,000								
Staff : (1 J.R.A.)	... Rs. 3,348 (including allowances)								
	<u>Total Rs. 4,348 (including allowances)</u>								
72.3	Ultrasonic absorptions in liquids by Dr. A. M. Srivastava, Physics Department, Allahabad University. Grant asked for : Equipment : Rs. 8,000 Contingencies : Rs. 1,000 Staff : Rs. 1,287 Total Rs. 10,287								
72.4	Physical properties of gelatinous substances by Dr. A. M. Srivastava, Physics Department, Allahabad University. Grant asked for : Equipment : Rs. 7,000 Contingencies : Rs. 1,500 Staff : Nil Total Rs. 8,500 The Committee noted that Dr. Verma had asked for an equipment grant of Rs. 8000/- and Dr. Srivastava for Rs. 7000/-. The Committee felt that both these								

Recommendations of the Committee of the Board	Recommendations of the Board																
72. 1 & 72.2 p. 241 The Committee recommended the following grants for continuance of the Research Schemes during 1955-56: 72. 1 Oceanographic research Dr. C. Mahadevan. <table> <tr> <td>Equipment</td> <td>Rs. 4, 000</td> </tr> <tr> <td>Contingencies</td> <td>Rs. 1, 500</td> </tr> <tr> <td>Staff</td> <td>Rs. 3, 785 (including allowances)</td> </tr> <tr> <td>Total:</td> <td><u>Rs. 9,285</u> " "</td> </tr> </table> 72. 2 Measurement of feeble X-rays-Prof. K. Banerji. <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. 3,349 (including allowances)</td> </tr> <tr> <td>Total:</td> <td><u>Rs. 4,349</u> " "</td> </tr> </table>	Equipment	Rs. 4, 000	Contingencies	Rs. 1, 500	Staff	Rs. 3, 785 (including allowances)	Total:	<u>Rs. 9,285</u> " "	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 3,349 (including allowances)	Total:	<u>Rs. 4,349</u> " "	72. 1 p. 241 The Board endorsed the recommendation of its Committee. 72. 2 p. 241 The Board endorsed the recommendation of its Committee.
Equipment	Rs. 4, 000																
Contingencies	Rs. 1, 500																
Staff	Rs. 3, 785 (including allowances)																
Total:	<u>Rs. 9,285</u> " "																
Equipment	Nil																
Contingencies	Rs. 1,000																
Staff	Rs. 3,349 (including allowances)																
Total:	<u>Rs. 4,349</u> " "																

RENEWALS

Item No.	Particulars																																
	schemes (72.3 and 72.4 above) should be combined as far as equipment was concerned, and it authorised the Chairman to recommend a suitable grant for the purchase of new equipment after ascertaining from both Dr. Verma and Dr. Srivastava what equipment they already had for this kind of work and what they had done with Rs. 4000/- sanctioned previously for this purpose. 72.5 X-ray diffraction studies of crystals by Prof. K. Banerji, Prof. of Physics, University of Allahabad. <table><tr><td>Grant asked for : Equipment : Nil</td><td>Contingencies : Rs. 1,000</td></tr><tr><td>Staff : Rs. 4,634</td><td>Total Rs. 5,634 (including allowances)</td></tr></table> The following grant was recommended : <table><tr><td>Equipment</td><td>...</td><td>Rs. 3,000</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 1,000</td></tr><tr><td>Staff : (1 J.R.A.)</td><td>...</td><td>Rs. 4,634 (including allowances)</td></tr><tr><td>Total</td><td></td><td><u>Rs. 8,634 (including allowances)</u></td></tr></table> 2.6 Thermal diffusion and inter-diffusion of gases by Prof. B. N. Srivastava, Indian Association for the Cultivation of Science, Calcutta <table><tr><td>Grant asked for : Equipment : Rs. 4,000</td><td>Contingencies : Rs. 1,000</td></tr><tr><td>Staff : Rs. 3,280</td><td>Total Rs. 8,280 (including allowances)</td></tr></table> The following grant was recommended : <table><tr><td>Equipment</td><td>...</td><td>*Rs. 4,000</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 1,000</td></tr><tr><td>Staff : (1 J.R.A.)</td><td>...</td><td>Rs. 3,305 (including allowances)</td></tr><tr><td>Total</td><td></td><td><u>Rs. 8,305 (including allowances)</u></td></tr></table> *It was noted that the equipment grant of Rs. 4,000/- for the purchase of Kathorimeter etc., was considered by the Committee at its last meeting and not recommended. However the Committee authorised the Chairman to make enquiries from Dr. Srivastava and recommend the grant (upto a maximum of Rs. 4,000/-) if it was absolutely essential.	Grant asked for : Equipment : Nil	Contingencies : Rs. 1,000	Staff : Rs. 4,634	Total Rs. 5,634 (including allowances)	Equipment	...	Rs. 3,000	Contingencies	...	Rs. 1,000	Staff : (1 J.R.A.)	...	Rs. 4,634 (including allowances)	Total		<u>Rs. 8,634 (including allowances)</u>	Grant asked for : Equipment : Rs. 4,000	Contingencies : Rs. 1,000	Staff : Rs. 3,280	Total Rs. 8,280 (including allowances)	Equipment	...	*Rs. 4,000	Contingencies	...	Rs. 1,000	Staff : (1 J.R.A.)	...	Rs. 3,305 (including allowances)	Total		<u>Rs. 8,305 (including allowances)</u>
Grant asked for : Equipment : Nil	Contingencies : Rs. 1,000																																
Staff : Rs. 4,634	Total Rs. 5,634 (including allowances)																																
Equipment	...	Rs. 3,000																															
Contingencies	...	Rs. 1,000																															
Staff : (1 J.R.A.)	...	Rs. 4,634 (including allowances)																															
Total		<u>Rs. 8,634 (including allowances)</u>																															
Grant asked for : Equipment : Rs. 4,000	Contingencies : Rs. 1,000																																
Staff : Rs. 3,280	Total Rs. 8,280 (including allowances)																																
Equipment	...	*Rs. 4,000																															
Contingencies	...	Rs. 1,000																															
Staff : (1 J.R.A.)	...	Rs. 3,305 (including allowances)																															
Total		<u>Rs. 8,305 (including allowances)</u>																															

Recommendations of the Committee of the Board	Recommendations of the Board								
72. 3 & 72. 4 p. 241-243 The Committee recommended that the DSIR be authorised to take necessary action departmentally in consultation with the Chairman of the Research Committee.	72. 3 & 72.4 p. 241-243 The Board endorsed the recommendation of its Committee.								
72. 5 p. 243 The Committee recommended the following renewal grant for the Research Scheme on X-ray diffraction studies of crystals by Prof. K. Banerji. <table> <tr> <td>Equipment</td><td>Rs. 3,000</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff</td><td>Rs. 2,659 (including allowances)</td></tr> <tr> <td>Total:</td><td>Rs. 6,659 " "</td></tr> </table>	Equipment	Rs. 3,000	Contingencies	Rs. 1,000	Staff	Rs. 2,659 (including allowances)	Total:	Rs. 6,659 " "	72. 5 p. 243 The Board endorsed the recommendation of its Committee.
Equipment	Rs. 3,000								
Contingencies	Rs. 1,000								
Staff	Rs. 2,659 (including allowances)								
Total:	Rs. 6,659 " "								
72. 6 p. 243 The Committee recommended that the Research Scheme on thermal diffusion and inter-diffusion of gases by Prof. B. N. Srivastava be renewed and the following grant be made: <table> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff</td><td>Rs. 3,305 (including allowances)</td></tr> <tr> <td>Total:</td><td>Rs. 4,305 " "</td></tr> </table> As regards equipment, the Committee recommended that the DSIR be authorised to take necessary action departmentally in consultation with the Chairman of the Research Committee.	Contingencies	Rs. 1,000	Staff	Rs. 3,305 (including allowances)	Total:	Rs. 4,305 " "	72. 6 p. 243 The Board endorsed the recommendations of its Committee.		
Contingencies	Rs. 1,000								
Staff	Rs. 3,305 (including allowances)								
Total:	Rs. 4,305 " "								

Item No.	Particulars
72.7	Flourescence and absorption spectra of organic molecules by Dr. V. Ramakrishna Rao, Reader in Physics, Andhra University
	Grant asked for : Equipment : Rs. 1,000 Contingencies : Rs. 1,000 Staff : Rs. 2,420 Total Rs. 4,420 (including allowances)
	The scheme was recommended with the following grant :
	Equipment ... Nil Contingencies ... Rs. 1,000 Staff : (1 J.R.A.) ... Rs. 2,420 (including allowances) Total Rs. 3,420 (including allowances)
72.8	Investigation of spectra of molecules in visible and ultraviolet regions by Dr. K. Majumdar, Reader in Physics, University of Allahabad
	Grant asked for : Equipment : Rs. 500 Contingencies : Rs. 500 Staff : Rs. 3,300 Total Rs. 4,300 (including allowances)
	The scheme was recommended with the following grant :
	Equipment ... Rs. 500 Contingencies ... Rs. 500 Staff : (1 J.R.A.) ... Rs. 3,400 (including allowances) Total Rs. 4,400 (including allowances)
72.9	Special studies of heterocyclic aromatic compounds by Dr. M. R. Padhye, Department of Chemical Technology, Bombay University
	Grant asked for : Equipment : Nil Contingencies : Rs. 1000 Staff : Rs. 3,084 Total : Rs. 4,084 (including allowances)
	The scheme was recommended with the following grant :
	Equipment ... Rs. 4,084 Contingencies ... Rs. 1,000 Staff : (1 J.R.A.) ... Rs. 3,100 (including allowances) Total Rs. 8,184 (including allowances)

Item No.	Particulars																				
	Dr. Padhye had not stated the items of equipment he would purchase from this grant. As such the Committee authorised the Chairman to ascertain from Dr. Padhye the details and then recommend, if he considered essential, the equipment grant asked for.																				
72.10	Design and development of certain electrical measuring instruments by Shri N. M. Athavale, Radio Lamp Works, Poona <table><tr><td>Grant asked for : Equipment : Rs. 4,000</td><td>Contingencies : Rs. 2,000</td></tr><tr><td>Staff : Rs. 3,020</td><td>Total Rs. 9,020 (including allowances)</td></tr></table> The Committee recommended the following grant : <table><tr><td>Equipment</td><td>...</td><td>Rs. 4,000</td><td></td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 2,000</td><td></td></tr><tr><td>Staff : (1 J.R.A.)</td><td>...</td><td>Rs. 3,020</td><td>(including allowances)</td></tr><tr><td></td><td>Total</td><td>Rs. 9,020</td><td>(including allowances)</td></tr></table>	Grant asked for : Equipment : Rs. 4,000	Contingencies : Rs. 2,000	Staff : Rs. 3,020	Total Rs. 9,020 (including allowances)	Equipment	...	Rs. 4,000		Contingencies	...	Rs. 2,000		Staff : (1 J.R.A.)	...	Rs. 3,020	(including allowances)		Total	Rs. 9,020	(including allowances)
Grant asked for : Equipment : Rs. 4,000	Contingencies : Rs. 2,000																				
Staff : Rs. 3,020	Total Rs. 9,020 (including allowances)																				
Equipment	...	Rs. 4,000																			
Contingencies	...	Rs. 2,000																			
Staff : (1 J.R.A.)	...	Rs. 3,020	(including allowances)																		
	Total	Rs. 9,020	(including allowances)																		
	The Committee strongly felt that Shri Athavale should not take up the work on thermocouples but should continue and finish his present work on RF ammeters and in view of this suggestion the grant under 'Equipment' and 'Contingencies' will be used only to the extent necessary for the work on RF ammeters.																				
72.11	Investigations on molecular spectra by Dr. R. K. Asundi, Head of the Department of Spectroscopy, Banaras Hindu University <table><tr><td>Grant asked for : Equipment : Nil</td><td>Contingencies : Rs. 2,000</td></tr><tr><td>Staff : Rs. 6,267</td><td>Total Rs. 8,262 (including allowances)</td></tr></table> The scheme was recommended with the following grant : <table><tr><td>Equipment</td><td>...</td><td>Nil</td><td></td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 2,000</td><td></td></tr><tr><td>Staff : (2 J.R.A.s)</td><td></td><td>Rs. 6,268</td><td>(including allowances)</td></tr><tr><td></td><td>Total</td><td>Rs. 8,268</td><td>(including allowances)</td></tr></table>	Grant asked for : Equipment : Nil	Contingencies : Rs. 2,000	Staff : Rs. 6,267	Total Rs. 8,262 (including allowances)	Equipment	...	Nil		Contingencies	...	Rs. 2,000		Staff : (2 J.R.A.s)		Rs. 6,268	(including allowances)		Total	Rs. 8,268	(including allowances)
Grant asked for : Equipment : Nil	Contingencies : Rs. 2,000																				
Staff : Rs. 6,267	Total Rs. 8,262 (including allowances)																				
Equipment	...	Nil																			
Contingencies	...	Rs. 2,000																			
Staff : (2 J.R.A.s)		Rs. 6,268	(including allowances)																		
	Total	Rs. 8,268	(including allowances)																		

Recommendations of the Committee of the Board	Recommendations of the Board								
72. 9 p. 245-247 The Committee recommended the renewal grant specified below for the research scheme on Spectra of heterocyclic aromatics by Dr. M. R. Padhye. <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. 3,110 (including allowances)</td></tr> <tr> <td>Total:</td><td>Rs. 4,110 „ „</td></tr> </table> As regards Equipment, the Committee recommended that the DSIR be authorised to sanction the necessary grant in consultation with the Chairman of the Research Committee.	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 3,110 (including allowances)	Total:	Rs. 4,110 „ „	72. 9 p. 245-247 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff	Rs. 3,110 (including allowances)								
Total:	Rs. 4,110 „ „								
72. 10 p. 247 The Committee recommended the following grant for continuance of the research scheme on R.F. Ammeters by Mr. N. M. Athavale. <table> <tr> <td>Staff</td><td>Rs. 3,020 (including allowances)</td></tr> </table> As regards Equipment and Contingencies, the Committee recommended that the DSIR may sanction suitable grants to the extent necessary for the programme suggested by the Research Committee, in consultation with the Chairman of the Research Committee.	Staff	Rs. 3,020 (including allowances)	72. 10 p. 247 The Board endorsed the recommendations of its Committee.						
Staff	Rs. 3,020 (including allowances)								
72. 11 p. 247 The Committee recommended the grant shown below for continuance of the research scheme on Molecular Spectra by Dr. R. K. Asundi. <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,500</td></tr> <tr> <td>Staff</td><td>Rs. 6,268 (including allowances)</td></tr> <tr> <td>Total:</td><td>Rs. 7,768 „ „</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 1,500	Staff	Rs. 6,268 (including allowances)	Total:	Rs. 7,768 „ „	72. 11 p. 247 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,500								
Staff	Rs. 6,268 (including allowances)								
Total:	Rs. 7,768 „ „								

Item No.	Particulars
72.12	Electron diffraction studies of semi conductor rectifiers and development of a copper oxide triode by Prof. K. R. Dixit, Institute of Science, Bombay
	Grant asked for : Equipment : Rs. 1,000 Contingencies : Rs. 1,500 Staff : Rs. 3,480 Total Rs. 5,980 (including allowances)
	The scheme was recommended with the following grant :
	Equipment ... Rs. 1,000 Contingencies ... Rs. 1,500 Staff : (1 J.R.A.) ... Rs. 3,480 (including allowances)
	Total Rs. 5,980 (including allowances)
72.13	Ruling engine for diffraction gratings by Prof. P. K. Kichlu, Professor of Physics, University of Delhi
	Grant asked for : Equipment : Rs. 1,000 Contingencies : Rs. 2,000 Staff : Rs. 6,472 Total : Rs. 9,472 (including allowances)
	The following grant was recommended :
	Equipment ... Rs. 1,000 Contingencies ... Rs. 2,000 Staff : (1 J.R.A., 1 Mechanic, 1 attendant) ... Rs. 6,472 (including allowances)
	Total Rs. 9,472 (including allowances)
72.14	Study of X-ray emission and absorption spectra in the region 1.8 to 10A° by Dr. G. B. Deodhar, Reader in Physics, University of Allahabad.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 2,790 Total : Rs. 3,790 (including allowances)
	The scheme was recommended with the following grant :
	Equipment ... Nil Contingencies ... Rs. 1,000 Staff : (1 J.R.A.) ... Rs. 2,790 (including allowances)
	Total Rs. 3,790 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board
72. 12, 72. 13 & 72. 14 p. 249 The Committee recommended the following grants for continuance of the research schemes during 1955-56 :	
72. 12 Electron diffraction studies—Dr. K. R. Dixit. Equipment Rs. 1,000 Contingencies Rs. 1,000 Staff Rs. 3,480 including allowance Total : Rs. 5,480 " "	72. 12 p. 249 The Board endorsed the recommendation of its Committee.
72. 13 Diffraction gratings—Dr. P. K. Kichlu. Equipment Rs. 1,000 Contingencies Rs. 2,000 Staff Rs. 6,430 including allowances Total Rs. 9,430 " "	72. 13 p. 249 The Board endorsed the recommendation of its Committee.
72. 14 X-ray Spectra—Dr. G. B. Deodhar. Equipment Nil Contingencies Rs. 1,000 Staff Rs. 2,790 including allowances Total Rs. 3,790 " "	72. 14 p. 249 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
72.15	Controlled excitation of molecules by methods of fluorescence and electron impact by Dr. N.L. Singh, Banaras Hindu University (now supervised by Dr. Asundi). Grant asked for : Equipment : Nil Staff : Rs. 3,244 Contingencies : Rs. 1,000 Total : Rs. 4,244 (including allowances) The scheme was recommended with the following grant : Equipment ... Nil Contingencies ... Rs. 1,000 Staff : (1 J.R.A.) ... Rs. 3,244 (including allowances) Total Rs. 4,244 (including allowances)
72.16	X-ray and optical studies in collagen by Dr. G. N. Ramachandran, Professor of Physics, University of Madras. Grant asked for : Equipment : Nil Staff : Rs. 2,980 Contingencies : Rs. 1,000 Total : Rs. 3,980 (including allowances) The scheme was recommended with the following grant : Equipment ... Nil Contingencies ... Rs. 1,000 Staff : (1 J.R.A.) ... Rs. 4,200 (including allowances) Total Rs. 5,200 (including allowances)
72.17	Linear time of flight mass-spectrometry by Dr. B. D. Nag Chaudhuri, Palit Professor of Physics, Calcutta University. Grant asked for : Equipment : Rs. 7,000 Staff : Rs. 5,676 Contingencies : Rs. 1,000 Total : Rs. 13,676 (including allowances) The following grant was recommended : Equipment ... Rs. 2,000 Contingencies ... Rs. 1,000 Staff : (1 J.R.A.) ... Rs. 5,676 (including allowances) Total Rs. 8,676 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board
72. 15, 72. 16 & 72. 17 p. 251 The Committee recommended the grants specified below for continuance of the research schemes during 1955-56 : 72. 15 Excitation of molecules etc. Dr. N.L. Singh Equipment Nil Contingencies Rs. 1,000 Staff Rs. 3244 including allowances Total Rs. 4244 " " 72. 16 X-ray study of collagen—Dr. G. N. Ramachandran. Equipment Nil Contingencies Rs. 1,000 Staff Rs. 4182 including allowances Total Rs. 5182 " " 72. 17 Flight mass spectrometry—Dr. B. D. Nag Chodhuri. Equipment Rs. 2,000 Contingencies Rs. 1,000 Staff Rs. 5,053 including allowances Total Rs. 8,053 " "	72. 15 p. 251 The Board endorsed the recommendation of its Committee. 72. 16 p. 251 The Board endorsed the recommendation of its Committee. 72. 17 p. 251 The Board was of the opinion that general provision of facilities for nuclear research in the universities was the concern of the University Grants Commission and question of grants for specific projects must be dealt with by the Atomic Energy Commission. While agreeing to the continuance of the scheme on flight mass spectrometry, the Board recommended that the scheme be considered by the Committee of the Atomic Energy Commission which was meeting immediately after the Board meeting.

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72. 18 p. 253

The Committee recommended continuance of the research scheme on Soft-X-ray spectroscopy by Dr. Das Gupta during 1955-56 with the following grant :

Equipment	Nil		
Contingencies	Rs. 1,000		
Staff	Rs. 3,218 including allowances		
Total	<u>Rs. 4,218</u>	"	"

73. 0 p. 253

The Committee noted.

73. 1 p. 253

The Committee recommended the following grant for continuance of the research scheme on Infra-red radiation by Dr. Ramdas during 1955-56 :

Equipment	Unspent balance		
Contingencies	Rs. 2,500		
Staff	Rs. 9,473 including allowances		
Total	<u>Rs. 11,973</u>	"	"

72. 18 p. 253

The Board endorsed the recommendation of its Committee.

73. 0 p. 253

The Board noted.

73. 1 p. 253

The Board endorsed the recommendation of its Committee.

Item No.	Particulars
73.2	Atmospheric ozone and weather by Dr. K. R. Ramanathan, Ahmedabad. Grant asked for : Equipment : Rs.8,000+unspent balance Contingencies : Rs. 4,000 Staff : Rs. 11,399 Total : Rs. 23,399 (i. a.)+unspent balance The work done in India had added substantially to our knowledge of the distribution of ozone in the earth's atmosphere. Both western disturbances as well as tropical storms effect the ozone amount. There was a rapid increase in ozone amount as we pass from the region of upper equatorial easterlies to middle latitude westerlies and it was important to study the variations of ozone in the transition region. Dr. Ramanathan was therefore taking action to set up a station as far north as possible either in Kashmir or Amritsar. For this purpose, it was necessary to have another Senior Research Assistant. He also said that the C.S.I.R. had already agreed to the purchase of a Spectrophotometer to replace the one which he had obtained on loan from the Metreological Department since the Meteorogical Department were to set up a station at Kodaikanal. The International Ozone Commission was anxious that India should set up a permanent station at Kodaikanal to serve as a monitoring base for keeping track of change in the intensity of the solar ultra violet radiation. The cost of this instrument had gone up and an additional grant was necessary to enable him to purchase a new instrument. He also wanted to build two more surface ozone measuring instruments. The Committee recommended the addition of a Senior Research Assistant and the necessary additional equiment grant for the instrument. 73.3 Study of microseisms and sea-waves and their correlation with cyclonic distrurbances by Dr. S. K. Chakrabarty, Howrah. Grant asked for : Equipment : unspent balance Contingencies : Rs. 1000 Staff : Rs. 5,350 Total Rs. 6,350 (i. a.)+unspent balance
74	Subject : Radio research schemes (renewals) Note : 74.0 The Radio Research Committee at its meeting held on January 19, 1955 considered the renewal applications of the following schemes and recommended their continuation during 1955-56.

Recommendations of the Committee of the Board	Recommendations of the Board
73. 2 & 73. 3 p. 255 The Committee recommended the following grants for continuance of the research scheme during 1955-56 : 73. 2 Atmospheric Ozone—Dr. Ramanathan. Equipment Rs. 8,000 plus unspent balance Contingencies Rs. 3,000 Staff : (One additional SRA) Rs. 13,578 including allowances Total Rs. 24,578 73. 3 Study of Microseisms—Dr. Chakrabarty. Equipment Unspent balance Contingencies Rs. 1,000 Staff Rs. 4,329 including allowances Total Rs. 5,329 " "	73. 2 p. 255 The Board endorsed the recommendation of its Committee. 73. 3 p. 255 The Board endorsed the recommendation of its Committee.
74. 0 p. 255 The Committee noted.	74. 0 p. 255 The Board noted.

Item No.	Particulars
74.1	Study of the nature of atmospherics by Dr. S. R. Khastgir, Banaras
	Grant asked for : Equipment : Rs. 1,500 Contingencies : Rs. 500
	Staff : Rs. 3,624 Total Rs. 5,642 (including allowances)
	Investigation on atmospherics is an important item in the programme of the International Geophysical Year which has been adopted by the Indian National Committee. Since the India Meteorological Department and Dr. M. W. Chiplonkar, Head of the Physics Department, University of Poona will also be doing work on atmospherics, it was decided to draw the attention of the Co-ordinating Committee to be set up under the Radio Research Committee to these three centres and the need for having a programme that will utilize best the observations made in these three stations, both for meteorological and ionospheric purposes.
	The Committee recommended the following grant :
	Equipment Rs. 1,500
	Contingencies Rs. 500
	Staff : (1 J. R. A., 1 Lab. Attendant). 3,624 (including allowances)
	Total : 5,624 (including allowances)
74.2	Asborption of microwaves in 3 cm. region by Mr. Krishnaji, Allahabad
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,200
	Staff : Rs. 5,254 Total : Rs. 6,454 (including allowances)
	The Committee recommended the following grant :
	Equipment Nil
	Contingencies Rs. 1,200
	Staff : (1. J. R. A., and 1, Mechanic). Rs. 5,254 (including allowances)
	Total : Rs. 6,454 (including allowances)
74.3	Ionospheric investigations by Prof. S. K. Mitra, Calcutta
	Grant asked for : Equipment : Rs. 52,200 Contingencies : Rs. 11,100
	Staff : Rs. 58,235 Total : Rs. 1,21,535 (including allowances)
	The Committee understood from the representative of the C. S. I. R. that the question of funds and the status of the Haringhata Field Station is under consideration

Recommendations of the Committee of the Board	Recommendations of the Board																																
74. 1 & 74. 2 p. 257 The Committee recommended the following grants for continuance of the research schemes during 1955-56 : 74. 1 Nature of atmospherics—Dr. Khastgir. <table><tr><td>Equipment</td><td>Rs. 1,500</td><td></td><td></td></tr><tr><td>Contingencies</td><td>Rs. 500</td><td></td><td></td></tr><tr><td>Staff</td><td>Rs. 3,624 including allowances</td><td></td><td></td></tr><tr><td>Total</td><td>Rs. 5,624</td><td>„</td><td>„</td></tr></table> 74. 2 Absorption of microwaves—Dr. Krishnaji. <table><tr><td>Equipment</td><td>Nil</td><td></td><td></td></tr><tr><td>Contingencies</td><td>Rs. 1,000</td><td></td><td></td></tr><tr><td>Staff</td><td>Rs. 4,129 including allowances</td><td></td><td></td></tr><tr><td>Total</td><td>Rs. 5,129</td><td>„</td><td>„</td></tr></table>	Equipment	Rs. 1,500			Contingencies	Rs. 500			Staff	Rs. 3,624 including allowances			Total	Rs. 5,624	„	„	Equipment	Nil			Contingencies	Rs. 1,000			Staff	Rs. 4,129 including allowances			Total	Rs. 5,129	„	„	74. 1 p. 257 The Board endorsed the recommendation of its Committee. 74. 2 p. 257 The Board endorsed the recommendation of its Committee.
Equipment	Rs. 1,500																																
Contingencies	Rs. 500																																
Staff	Rs. 3,624 including allowances																																
Total	Rs. 5,624	„	„																														
Equipment	Nil																																
Contingencies	Rs. 1,000																																
Staff	Rs. 4,129 including allowances																																
Total	Rs. 5,129	„	„																														

Item No.	<i>Particulars</i>
	of the C. S. I. R. Meanwhile, the Committee recommended the continuance of the scheme with the existing staff and contingencies grants.
	The Committee also noted that progress of work on ionospheric research in Calcutta has been satisfactory and that its work should not suffer for lack of funds.
74.4	Absorption of dielectric properties in the microwave region by Prof. P. N. Sharma, Lucknow
	Grant asked for : Equipment : Nil Staff : Rs. 5,168
	Contingencies : Rs. 1,000 Total : Rs. 6,168 (including allowances)
	The Committee recommended the following grant :
	Contingencies Rs. 1,000 Staff : (I. J. R. A., and 1 Mechanic). Rs. 5,187 (including allowances) Total Rs. 6,187 (including allowances)
74.5	Millimicrosecond pulse generator by Prof. R. Filipowsky, Madras
	Grant asked for : Equipment : Nil Contingencies : Rs. 3,000 Staff : Rs. 6,600 Total : Rs. 9,600 (including allowances)
	The Committee recommended the following grant :
	Contingencies Rs. 3,000 Staff : (2 J. R. As) Rs. 6,566 (including allowances) Total Rs. 9,566 (including allowances)
74.6	Construction of 100 Watt R. C. type F. M. oscillator by Prof. H. Rakshit, Calcutta
	Grant asked for : Equipment : Nil Contingencies : Rs. 2,000 Staff : Rs. 7,524 Total : Rs. 9,524 (including allowances)
	The Committee recommended the following grant :
	Contingencies Rs. 2,000 Staff : (1. S. R. A., 1. J. R. A. for 6 months and 1 Mechanic). Rs. 7,449 (including allowances) Total : Rs. 9,449 (including allowances)

74.3 p. 257-259

The Committee recommended the continuance of the research scheme on the Ionosphere by Prof. S. K. Mitra and sanction of the following grant :

Equipment	Nil		
Contingencies	Rs. 2,500		
Staff	Rs. 26,866 including allowances		
Total	Rs. 29,366	„	„

74. 4, 74. 5 & 74. 6 p. 259

The Committee recommended the following grants for continuance of the research schemes during 1955-56 :

74. 4 Dielectric properties—Prof. P. N. Sharma

Equipment	Nil		
Contingencies	Rs. 1,000		
Staff	Rs. 5,187 including allowances		
Total	Rs. 6,187	„	„

74. 5 Pulse Generator—Prof. Filipowsky.

Equipment	Nil		
Contingencies	Rs. 3,000		
Staff	Rs. 6,566 including allowances		
Total:	Rs. 9,566	„	„

74. 6 100 Watt. F. M. Oscillator—Prof. H. Rakshit.

Equipment	Nil		
Contingencies	Rs. 2,000		
Staff	Rs. 7,509 (including allowances)		
Total:	Rs. 9,509	„	„

74. 3 p. 257-259

The Board endorsed the recommendation of its Committee.

74. 4 p. 259

The Board endorsed the recommendation of its Committee.

74. 5 p. 259

The Board endorsed the recommendation of its Committee.

74. 6 p. 259

The Board endorsed the recommendation of its Committee.

Item No.	Particulars
74. 7	Lunar and solar tides in the ionosphere by Mr. B. M. Banerjee, Calcutta
	Grant asked for : Equipment : Nil Contingencies : Rs. 1000 Staff : Rs. 6,360 Total : Rs. 7,360 (including allowances)
	The Committee recommended the following grant :
	Contingencies Rs. 1,000 Staff : (2 J. R. As.) Rs. 6,210 (including allowances) Total : <u>Rs. 7,210 (including allowances)</u>
	The Committee was of the opinion that the title of the scheme, as it stands, is too ambitious and the investigator may be requested to make the title more specific.
74.8	Recording and analysis of reflection of electromagnetic waves from the ionosphere at Ahmedabad by Dr. K. R. Ramanathan, Ahmedabad
	Grant asked for : Equipment : Rs. 4,000 Contingencies : Rs. 4,500 Staff : Rs. 16,346 Total : Rs. 24,846 (including allowances)
	The Committee recommended the following grant :
	Contingencies Rs. 4,500 Staff : (2 S. R. As (one for absorption work) 2 J. R. As). Rs. 16,346 (including allowances) Total : <u>Rs. 20,846 (including allowances)</u>
74.9	Design and construction of ionospheric recorder by Prof. K. Sreenivasan, Bangalore
	Grant asked for : Equipment : Rs. 8,000 Contingencies : Rs. 500 Staff : Rs. 3,420 Total : Rs. 11,920 (including allowances)
	The Committee recommended the following grant and also the carry over of the unspent balance of the grant under equipment from the previous year.
	Equipment Rs. 8,000 Contingencies Rs. 500 Staff : (1 J. R. A.) Rs. 2,695 (including allowances) Total : <u>Rs. 11,195 (including allowances)</u>

Recommendations of the Committee of the Board	Recommendations of the Board																								
74. 7, 74.8 & 74.9 p. 261 The Committee recommended the continuance of the research schemes during 1955-56 and sanction of the following grants: 74.7 Tides in the ionosphere—Mr. B. M. Banerjee. <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. 6,210 including allowances</td> </tr> <tr> <td>Total:</td> <td><u>Rs. 7,210</u> " "</td> </tr> </table> It was also recommended that the investigator be requested to change the title of the scheme into a more specific one. 74.8 Reflection from the ionosphere—Dr. Ramana- than. <table> <tr> <td>Equipment</td> <td>Nil</td> </tr> <tr> <td>Contingencies</td> <td>Rs. 4,000</td> </tr> <tr> <td>Staff. (I SRA & 2 JRAs.)</td> <td>Rs. 12,257 (including allowances)</td> </tr> <tr> <td>Total</td> <td><u>Rs. 16,257</u> " "</td> </tr> </table> 74. 9 Ionospheric Recorder—Prof. K. Srinivasan. (Work on the scheme has not yet started). <table> <tr> <td>Equipment</td> <td>Rs. 8,000</td> </tr> <tr> <td>Contingencies</td> <td>Rs. 500</td> </tr> <tr> <td>Staff</td> <td>Rs. 2,695 including allowances.</td> </tr> <tr> <td>Total</td> <td><u>Rs. 11,195</u> " "</td> </tr> </table>	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 6,210 including allowances	Total:	<u>Rs. 7,210</u> " "	Equipment	Nil	Contingencies	Rs. 4,000	Staff. (I SRA & 2 JRAs.)	Rs. 12,257 (including allowances)	Total	<u>Rs. 16,257</u> " "	Equipment	Rs. 8,000	Contingencies	Rs. 500	Staff	Rs. 2,695 including allowances.	Total	<u>Rs. 11,195</u> " "	74. 7 p. 261 The Board endorsed the recommendation of its Committee. 74. 8 p. 261 The Board endorsed the recommendation of its Committee. 74. 9 p. 261 The Board endorsed the recommendation of its Committee.
Equipment	Nil																								
Contingencies	Rs. 1,000																								
Staff	Rs. 6,210 including allowances																								
Total:	<u>Rs. 7,210</u> " "																								
Equipment	Nil																								
Contingencies	Rs. 4,000																								
Staff. (I SRA & 2 JRAs.)	Rs. 12,257 (including allowances)																								
Total	<u>Rs. 16,257</u> " "																								
Equipment	Rs. 8,000																								
Contingencies	Rs. 500																								
Staff	Rs. 2,695 including allowances.																								
Total	<u>Rs. 11,195</u> " "																								

Item No.	Particulars
74.10	Microwave technique and applications by Dr. K. Rangadhama Rao, Waltair. Grant asked for : Equipment : Rs. 3,000 Contingencies : Rs. 2,000 Staff : Rs. 5,631 Total : Rs. 10,631 (including allowances) The Committee was of the opinion that field of investigation as proposed by Prof. Rangadhama Rao was too wide and he may be requested to concentrate over a more specific aspect of the problem in the microwave region. The Committee recommended the following grant : Equipment Rs. 3,000 Contingencies Rs. 2,000 Staff : (1 S. R. A., and 1, Mechanic). Rs. 5,631 (including allowances) Total : Rs. 10,631 (including allowances)
74.11	Travelling wave disturbances in the ionosphere by spaced receiver method by Dr. B. Ramachandra Rao, Waltair. Grant asked for : Equipment : Rs. 5,000 Contingencies : Rs. 2,000 Staff : Rs. 8,964 Total : Rs. 15,964 (including allowances) The Committee noted that the scheme forms part of the programme of the International Geophysical Year. The Committee recommended the following grant : Equipment Rs. 5,000 Contingencies Rs. 2,000 Staff : (2 J. R. As., 1 Mechanic). Rs. 8,036 (including allowances) Total : Rs. 15,036 (including allowances)
74.12	Investigation on microwave propagation by Prof K. Sreenivasan, Bangalore. Grant asked for : Equipment : Rs. 8,000 Contingencies : Rs. 1,000 Staff : Rs. 12,420 Total : Rs. 21,420 (including allowances) The Committee recommended the following grant and also the carry over of the unspent balance under equipment from the previous year. Equipment Rs. 8,000 Contingencies Rs. 500 Staff : (1 J. R. A.) Rs. 2,695 (including allowances) Total Rs. 11,195 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board
74. 10, 74. 11 & 74. 12 p. 263 The Committee recommended the continuance of the research schemes with the grants mentioned against each during 1955-56: 74. 10 Microwave technique—Dr. K. R. Rao. Equipment Rs. 3,000 Contingencies Rs. 1,000 Staff Rs. 5,206 (including allowances.) Total Rs. 9,206 " " The Committee recommended that Dr. Rao be requested to concentrate on a specific aspect of the problem. 74. 11 Travelling wave disturbances—Dr. B. R. Rao. Equipment Rs. 5,000 Contingencies Rs. 2,000 Staff. Rs. 8,036 (including allowances). Total: Rs. 15,036 " " 74. 12 Microwave propagation Prof. K. Srinivasan. (Work on the scheme had not started yet). Equipment Rs. 8,000 Contingencies Rs. 500 Staff Rs. 2,695 (including allowances). Total: Rs. 11,195 " "	74. 10 p. 263 The Board endorsed the recommendations of its Committee. 74. 11 p. 263 The Board endorsed the recommendation of its Committee. 74. 12 p. 263 The Board endorsed the recommendation of its Committee.

RENEWALS

Item No.	Particulars
75	Subject : Research schemes on geological time (renewals) Note : 75.0 The Committee for the Measurement of Geological Time in India (Chairman : Dr. D. N. Wadia) has recommended the following schemes for renewal. 75.1 Age determination of certain igneous and metamorphic rocks by Prof. C. Mahadevan, Andhra University. Grant asked for : Equipment : Rs. 3,000 Contingencies : Rs. 3,000 Staff : Rs. 6,881 Total : Rs. 12,881 (including allowances) It is shown that the age obtained for Chhota Nagpur allanite (787 M.Y.-log formula) is consistent with geological evidence and is of the same order as that given by several research workers for different minerals occurring in the Satpura belt. It is highly significant that the age of the Anakapalli allanite (1401 M. Y.-log formula) should be of the same order as the reported alpha-helium age for Ongole Magnetite (1350 M. Y.) and the Kanjamalai magnetite (1300 M. Y.) The Eastern Ghats cycle is surmised to be younger than the Dharwarian cycle, as dated from two minerals belonging to the undoubted Dharwar region, namely the Yediyoor monazite with a reported age of 1850 M. Y. and the Halenarsipur magnetite with an age of 1740 M. Y. The available evidence is not capable of fixing definitely the position of Nellore pegmatites vis-a-vis the Dharwar and Eastern Ghats cycles. The Nellore Samarskite has yielded an age of 1658 M. Y. (log formula) but the variations in the reported ages (1658, 1728, 1913-log formula) bring it well on a par with the ages given for Dharwar cycle. Thus the Nellore schist belt may be either a part of the Dharwar cycle (Mysore Dharwar Province) or may represent a sequence in between the Dharwarian and Eastern Ghats pagmatitic cycles. A precise dating of radioactive minerals by mass analysis of U, Th and Pb isotopes will afford a dependable conclusion on this subject. Experimental techniques for spectrochemical analysis of Rb and Sr have been standardised. At the suggestion of Prof. L. H. Ahrens of Oxford, the possibilities of developing methods for the determination of Rb and Sr in solutions are being investigated. It is felt that in view of the divergent emission characteristics of Rb and Sr, their determination in two separate operations will improve the dependability of the methods. Work is in progress on lepidolites from Bastar, Hazaribagh and Kashmir and some Rb-rich biotites and microclines.

Recommendations of the Committee of the Board	Recommendations of the Board
75. 0 p. 265 The Committee noted.	75. 0 p. 265 The Board noted.

RENEWALS

Item No.	Particulars												
	A complex absorption train, entirely blown in pyrex, has been fabricated. The equipment necessary for particle counting, using linear amplifier has been completed. Systematic work will be taken up shortly. Twenty seven specimens of gneisses, leptynites and charnockites drawn from the Salem-Yercaud area of Madras State and 36 specimens of Khondalites drawn from the various parts of Andhra State have been examined for their B-activity. The distribution of radioactivity in the charnockites and associated rocks is examined from three aspects : (i) the variations in the radioactivity of these rocks and its relationship to mineralogical constitute (ii) radioactivity and petrogenesis, and (iii) statistical analysis. The radioactivity of charnockites appears to be associated with alkali feldspars and more particularly potash feldspars. In the diopside-hornblende gneisses of Salem, the felsic component seems to determine the radioactive content of the rock. The radioactivity data on Khondalites has been studied from three aspects : (i) mineralogical content and radioactivity, (ii) associational characteristics and radioactivity and (iii) radioactivity and petrogenesis. The radioactive content of khondalites (averaging 9.317×10^{-6} gms. of U/per gm. of rock) is significantly high. An economic implication follows from the above considerations. It is not unlikely that in some favoured localities, uranium dissemination may attain sufficient concentration to constitute a significant source of uranium. It is suggested that such a search for uranium may profitably be begun with systematic radiometric survey of khondalites rich in carbonaceous and argillaceous components. The Committee recommended the following grant. <table><tr><td>Equipment</td><td>...</td><td>Rs 3,000</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 3,000</td></tr><tr><td>Staff</td><td>...</td><td>Rs. 6,881 (including allowances)</td></tr><tr><td>Total</td><td>...</td><td>Rs. 12,881 (including allowances)</td></tr></table>	Equipment	...	Rs 3,000	Contingencies	...	Rs. 3,000	Staff	...	Rs. 6,881 (including allowances)	Total	...	Rs. 12,881 (including allowances)
Equipment	...	Rs 3,000											
Contingencies	...	Rs. 3,000											
Staff	...	Rs. 6,881 (including allowances)											
Total	...	Rs. 12,881 (including allowances)											

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars
	The Committee also agreed to grant an allowance of Rs. 30/- to Mr. H. V. L. Narsimba Rao, Laboratory attendant for clerical work in connection with the scheme.
75.2	Age determination of certain igneous and metamorphic rocks of pre-cambrian era by Dr. R. S. Krishnan, I. I. Sc., Bangalore.
Grant asked for :	Equipment : Rs. 20,000 Contingencies : Rs. 3,000 Staff : 4,232 Total : 27,232 (including allowances)
	The alpha-helium method has been continued and the halium-ratios have been determined for a number of specimens, mostly magnetites and quartz-magnetites.
	Regarding the rubidium-stronium method, lepidolite specimens from Bastar are being examined.
	The Committee recommended the following grant.
	Equipment ... Rs. 20,000 (unspent balance for mass spectrometer) Contingencies ... Rs. 3,000 Staff ... Rs. 4,232 (including allowances) Total ... Rs. 27,232 (including allowances)
75.3	Age determination of rocks by Director, Birbal Sahni Institute of Palaeobotany.
Grant asked for :	Equipment : Rs. 3,000 Contingencies : Rs. 3,000 Staff : Rs. 8,310 Total : Rs. 14,310 (including allowance)
	Samples have been examined for microfossils from the following horizons :—
	Cambrian of the Salt Range, Vindhyan, Simla slates, Deoban series, Jaunsar series, Tanawal series, Blaini-boulder bed, Mandhali-boulder bed, Infra-Krols, Krol series, Shali limestone, Poonch Gondwanas, Darjeeling Gondwanas and one sample from Kosi area in Nepal.
	Vindhyan :
	Samples from the four main divisions of the Vindhyan system, viz. the Semri, Kaimur, Rewa and Bhandar series have been examined. Microfossils were recovered only from two samples, i.e. from the sirbus shales (Bhandar series) and the Suket shales (Kaimur series). These consist of algal remains (resembling Cyanophyceae and Desmidiaceae shaped bodies) a number of fungal spores, and a filamentous body. Taken as a whole these

Recommendations of the Committee of the Board	Recommendations of the Board								
75. 1 p. 265-269 The Committee recommended the continuance of the research scheme on Age determination by Prof Mahadevan during 1955-56 with the following grant. <table> <tr> <td>Equipment</td><td>Rs. 3,000</td></tr> <tr> <td>Contingencies</td><td>Rs. 2,500</td></tr> <tr> <td>Staff</td><td>Rs. 5,081 (including allowances).</td></tr> <tr> <td>Total:</td><td>Rs. 10,581 " "</td></tr> </table> The Committee did not recommend the grant of any allowance for clerical assistance as such assistance should be provided by the institution receiving the grant.	Equipment	Rs. 3,000	Contingencies	Rs. 2,500	Staff	Rs. 5,081 (including allowances).	Total:	Rs. 10,581 " "	75. 1 p. 265-269 The Board endorsed the recommendations of its Committee.
Equipment	Rs. 3,000								
Contingencies	Rs. 2,500								
Staff	Rs. 5,081 (including allowances).								
Total:	Rs. 10,581 " "								
75. 2 p. 269 The Committee recommended the following grant for continuance of the research scheme on Age determination by Dr. R. S. Krishnan during 1955-56: <table> <tr> <td>Equipment</td><td>Unspent balance</td></tr> <tr> <td>Contingencies</td><td>Rs. 3,000</td></tr> <tr> <td>Staff</td><td>Rs. 4,232 (including allowances).</td></tr> <tr> <td>Total:</td><td>Rs. 7,232 " " (plus unspent balance under equipment).</td></tr> </table>	Equipment	Unspent balance	Contingencies	Rs. 3,000	Staff	Rs. 4,232 (including allowances).	Total:	Rs. 7,232 " " (plus unspent balance under equipment).	75. 2 p. 269 The Board endorsed the recommendation of its Committee.
Equipment	Unspent balance								
Contingencies	Rs. 3,000								
Staff	Rs. 4,232 (including allowances).								
Total:	Rs. 7,232 " " (plus unspent balance under equipment).								

RENEWALS

Item No.	Particulars												
	microfossils are not in conflict with the early Palaeozoic age ascribed to the Vindhyan system on the basis of stratigraphical data. They suggest that at least a part of the Vindhyan system should be included within the Cambrian. The data obtained so far does not provide sufficient grounds for lifting the Vindhyan to a horizon younger than this. Krols and Infra-Krols : About 30 samples of Krols and Infra-Krols from Naini Tal, Mussoorie and Chakrata areas have been macerated. None except one (sample M. G. T. 20) has yielded any microfossils. This sample, from Naini Tal area, has yielded a large number of spores, fragments of woods and cuticles. Majority of the spores and cuticles are very similar to those found in the lower Gondwana rocks of India. A short note has already been published showing a few types found in the shale. Detailed work on this problem is being continued. The Committee recommended the following grant : <table><tr><td>Equipment</td><td>...</td><td>Rs. 3,000</td></tr><tr><td>Contingencies</td><td>...</td><td>Nil</td></tr><tr><td>Staff</td><td>...</td><td>Rs. 8,310 (including allowances)</td></tr><tr><td>Total</td><td>...</td><td>Rs. 11,310 (including allowances)</td></tr></table> 75.4 Palynology scheme by the Director, Birbal Sahni Institute of Palaeobotany, Lucknow. Grant asked for : Equipment : Rs. 4,500 Contingencies : Rs. 3,500 Staff : Rs. 8,959 Total : Rs. 16,959 (including allowances) The collection of living plants numbering over 1,000 species has been made chiefly from N. W. India. The present collection is distributed over 125 families of angiosperms and some of gymnosperms and ferns. Many of the plant species have been identified. 300 Acetolysed pollen preparations have so far been made. Besides, a reference collection of unacetolysed pollen slides, numbering 239 has also been prepared. This reference collection is helpful in the identification of atmospheric pollen. All the acetolysed slides have been examined. A detailed study of the pollen of the available species of Caesalpinoideae, Amarantaceae and Gramineae has been made.	Equipment	...	Rs. 3,000	Contingencies	...	Nil	Staff	...	Rs. 8,310 (including allowances)	Total	...	Rs. 11,310 (including allowances)
Equipment	...	Rs. 3,000											
Contingencies	...	Nil											
Staff	...	Rs. 8,310 (including allowances)											
Total	...	Rs. 11,310 (including allowances)											

Recommendations of the Committee of the Board	Recommendations of the Board								
75. 3 269-271 The Committee recommended the following grant for continuance of the research scheme on Age determination by B. S. Palaeobotanical Institute, during 1955-56 : <table><tr><td>Equipment :</td><td>Nil</td></tr><tr><td>Contingencies :</td><td>Rs. 3,000</td></tr><tr><td>Staff :</td><td>Rs. 8,311 (including allowances)</td></tr><tr><td>Total :</td><td>Rs. 11,311 " "</td></tr></table>	Equipment :	Nil	Contingencies :	Rs. 3,000	Staff :	Rs. 8,311 (including allowances)	Total :	Rs. 11,311 " "	75. 3 p. 269-271 The Board endorsed the recommendation of its Committee.
Equipment :	Nil								
Contingencies :	Rs. 3,000								
Staff :	Rs. 8,311 (including allowances)								
Total :	Rs. 11,311 " "								

RENEWALS

Item No.	Particulars
	A list of Eurypalynous genera showing wide pollen morphological differences in their species has been prepared.
	The Committee recommended the following grant :
	Equipment ... Rs. 4,500
	Contingencies ... Rs. 3,500
	Staff ... Rs. 8,959 (including allowances)
	Total ... <u>Rs. 16,959 (including allowances)</u>
76	Subject : Metals research schemes (renewals)
	Note :
	76.0 The Metals Research Committee (Chairman : Mr. J. J. Ghandy) has recommended the continuance of the following research schemes.
	76.1 Gases in steel by Dr. G. P. Chatterjee, Calcutta.
	Grant asked for: Equipment : Nil Contingencies : Rs. 1,000
	Staff : Rs. 3,090 Total : Rs. 4,090 (including allowances)
	Mr. Bucknall and Dr. Schrader had discussed with Dr. G. P. Chatterjee and it had been agreed that an estimation of the gas contents of different varieties of steels made in India, and a study of the dynamic properties like impact values or fatigue stresses for different steels with varying gas contents should be made. At present work was confined to (a) observations of X-ray diffraction patterns of surcharged specimens and (b) assembly of the high vacuum extraction apparatus for the simultaneous determination of gases.
	76.2 Production of aluminium metal by the electrolysis of molten anhydrous aluminium chloride by Prof. Brahm Prakash, Bangalore.
	At the request of Prof. Brahm Prakash the Committee recommended continuance of the scheme for a period of six months.
	76.3 Electro-refining and recovery of copper from copper scrap by Mr. G. C. Mitter, Bombay.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,000
	Staff : Rs. 5,540 Total : Rs. 6,540 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board
75. 4 p. 271-273 The Committee recommended the following grant for continuance of the research scheme on Palynology by B. S. Palaeobotanical Institute during 1955-56 : Equipment Nil Contingencies Rs. 2,000 Staff Rs. 8,959 including allowances Total <u>Rs. 10,959</u> " "	75. 4 p. 271-273 The Board endorsed the recommendation of its Committee.
76. 0 p. 273 The Committee noted.	76. 0 p. 273 The Board noted.
76. 1 p. 273 The Committee recommended the following grant for continuance of the research scheme on Gases in Steel during 1955-56 : Equipment Nil Contingencies Rs. 1,000 Staff Rs. 3,060 including allowances Total <u>Rs. 4,060</u> " "	76. 1 p. 273 The Board endorsed the recommendation of its Committee.
76. 2 p. 273 The Committee recommended the following grant for continuance of the research scheme on production of aluminium metal by Prof. B. Parkash for six months only. Equipment Nil Contingencies Rs. 500 Staff Rs. 1,722 including allowances Total <u>Rs. 2,222</u> " "	76. 2 p. 273 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
	As it was not possible to obtain the necessary raw material from Kethri mines in Rajasthan, the investigator had to continue his work on Ghatsilla pyrites.
	Mr. Mitter may also be requested to submit a scheme, for carrying out investigation on electro-refining and recovery of copper from copper scrap, on a pilot plant scale.
76.4	Binary alloy systems with titanium as one of the alloying constituents by Dr. G. P. Chatterjee, Calcutta.
	Grant asked for : Equipment : Nil Staff : Rs. 3,266 Contingencies : Rs. 1,000 Total : 4,266 (including allowances)
	Study of the equilibrium diagram of aluminium-titanium alloys had been made by means of differential thermal analysis. Further experiments on metallography, X-ray diffraction work with Al-Ti alloys were in progress.
76.5	Corrosion of metals and alloys with special reference to the effect of titanium by Dr. G. P. Chatterjee and Dr. B. Chatterjee, Calcutta.
	Grant asked for : Equipment : Nil Staff : Rs. 3,228 Contingencies : Rs. 1,000 Total : Rs. 4,228 (including allowances)
	The effect of adding titanium metal to brass samples had been studied. The experiments had shown that titanium contents of 0.1 and 0.15% considerably improved the corrosion resistance of naval brass and aluminium in sea water.
	Experiments should be made with adding titanium and varying the other elements and also the effect of variations on the conditions of corrosion should be ascertained. The effect of minor elements should also be determined.
76.6	Development of new alloys (with reference to elements available in this country) by Dr. G. P. Chatterjee, Howrah.
	Grant asked for : Equipment : Nil Staff : Rs. 7,622 Contingencies : Rs. 1,500 Total Rs. 9,122 (including allowances)
	Mr. Bucknall and Mr. Vatchagandhy were of the opinion that the title of the scheme was too wide and should be changed to the particular alloys that were being studied. Dr. G. P. Chatterjee agreed to make the necessary change.

Recommendations of the Committee of the Board	Recommendations of the Board																								
76. 3 p. 273-275 The Committee recommended the continuance of the research scheme on Recovery of copper by Mr. G. C. Mitter and sanction of the following grant : <table> <tr> <td>Equipment</td> <td>Nil</td> </tr> <tr> <td>Contingencies</td> <td>Rs. 1,000</td> </tr> <tr> <td>Staff (1 JRA).</td> <td>Rs. 3,347 including allowances</td> </tr> <tr> <td>Total</td> <td>Rs. 4,347</td> </tr> </table> It was also recommended that Mr. Mitter be requested to submit a scheme for pilot plant investigation on electro-refining and recovery of copper.	Equipment	Nil	Contingencies	Rs. 1,000	Staff (1 JRA).	Rs. 3,347 including allowances	Total	Rs. 4,347	76. 3 p. 273-275 The Board endorsed the recommendations of its Committee.																
Equipment	Nil																								
Contingencies	Rs. 1,000																								
Staff (1 JRA).	Rs. 3,347 including allowances																								
Total	Rs. 4,347																								
76. 4, 76. 5 & 76. 6 p. 275 The Committee recommended the following grants for continuance of the Research Schemes during 1955-56. 76. 4 Binary alloy systems with titanium—Dr. G. P. Chatterjee. <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. 3,266 (including allowances)</td> </tr> <tr> <td>Total</td> <td>Rs. 4,266</td> </tr> </table> 76. 5 Corrosion of metals—Dr. B. Chatterjee. <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. 3,218 (including allowances)</td> </tr> <tr> <td>Total</td> <td>Rs. 4,218</td> </tr> </table> 76.6 Development of new alloys—Dr. B. Chatterjee. <table> <tr> <td>Equipment</td> <td>Nil</td> </tr> <tr> <td>Contingencies</td> <td>Rs. 1,500</td> </tr> <tr> <td>Staff</td> <td>Rs. 7,600 (including allowances)</td> </tr> <tr> <td>Total</td> <td>Rs. 9,100</td> </tr> </table>	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 3,266 (including allowances)	Total	Rs. 4,266	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 3,218 (including allowances)	Total	Rs. 4,218	Equipment	Nil	Contingencies	Rs. 1,500	Staff	Rs. 7,600 (including allowances)	Total	Rs. 9,100	76. 4 p. 275 The Board endorsed the recommendation of its Committee. 76. 5 p. 275 The Board endorsed the recommendation of its Committee. 76. 6 p. 275 The Board endorsed the recommendation of its Committee.
Equipment	Nil																								
Contingencies	Rs. 1,000																								
Staff	Rs. 3,266 (including allowances)																								
Total	Rs. 4,266																								
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Total	Rs. 4,218																								
Equipment	Nil																								
Contingencies	Rs. 1,500																								
Staff	Rs. 7,600 (including allowances)																								
Total	Rs. 9,100																								

RENEWALS

Item No.	Particulars
77	Subject : Fuel research schemes (renewals) Note : 77.0 The Fuel Research Committee (Chairman : Dr. M. S. Krishnan) recommended the following schemes for renewal during 1955-56. 77.1 Coal Blending & Coking Research—Jamshedpur. Grant asked for : Equipment : Nil Contingencies : Rs. 10,000 Staff : Rs. 31,000 Total : Rs. 41,000 (including allowances) (50% to be contributed by the C. S. I. R. & 50% by TISCO) Dr. Lahiri stated that under the coal blending and coking research programme considerable data had been collected and there were fairly sure possibilities of blending Indian coals. Further it was common knowledge that heating system of the ovens, width of the oven and other methods for coal preparation and preparation of charge considerably influenced the type of coke that could be obtained from a given blend. It may therefore be desirable to reorientate the programme of research so as to concentrate on study of methods of coal carbonization rather than trying out more coal blends. The Fuel Research Institute had designed a battery of experimental ovens which was larger than any existing in the country. Messrs Hindusthan Steel Co. had agreed to build this pilot plant free of cost. He further pointed out that such a large scale pilot plant required considerable finance for running it and requested the Committee to consider whether funds could be diverted from the C. B. C. R. organisation to this end, provided Messrs. TISCO were agreeable to do so, or whether the Council of Scientific & Industrial Research should be asked for separate grant for financing the pilot plant project. The Committee recommended : (1) that the Coal Blending & Coking Research scheme be renewed for another year, and the grant asked for, viz. Rs. 41,000/-be sanctioned, the question of further continuance of the scheme after 1955-56 be considered at a subsequent meeting of the Fuel Research Committee after the Director, Fuel Research Institute and Mr. N. Sen had an opportunity to discuss the matter with the Coal Blending & Coking Research Sub-Committee. (2) The pilot plant scheme for

Recommendations of the Committee of the Board	Recommendations of the Board
77. 0 p. 277 The Committee noted. 77. 1 p. 277 The Committee recommended the continuance of the research scheme on Coal Blending & Coking for another year with the following grant : Equipment Nil Contingencies Rs. 10,000 Staff Rs. 31,000 (including allowances) Total Rs. 41,000 " " As regards the future programme of research on coal carbonisation, the Committee recommended that the Fuel Research Committee be requested to consider the subject carefully in all its aspects and make detailed and specific recommendations for consideration of the B. S. I. R. in their next meeting.	77. 0 p. 277 The Board noted. 77. 1 p. 277 The Board endorsed the recommendations of its Committee.

Item No.	Particulars
	carbonisation at F. R. I. should be considered as a scheme by the C. S. I. R. and grants be made available outside F. R. I. normal budget.
77.2	Palaeobotanical investigation of Indian coals—Lucknow.
Grant asked for :	Equipment : Rs. 2,350 Contingencies : Rs. 2,500 Staff : Rs. 16,860 Total : Rs. 21,710 (including allowances)
	The Committee felt that increased staff was necessary so that the work could be divided into two distinct sections, one devoting to general survey and collection of palaeobotanical data on Indian coals and the other devoting to specific problems on seam correlation. it was therefore recommended that the programme of work should be reoriented in consultation with G. S. I. and F. R. I. The Committee recommended the grant of Rs. 21,710/- The additional staff of two more Junior Research Assistants and one Laboratory Assistant should also be sanctioned.
77.3	Mechanism of explosions—Dr. N. R. Tawde, Dharwar.
Grant asked for :	Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 6,085 Total : Rs. 7,085 (including allowances)
	The Committee recommended that Dr. Tawde be requested to prepare a comprehensive report on the last five year's work and a detailed programme of work on a specific problem for circulation to members. The grant of Rs. 7,085/- was recommended.
77.4	Combustion of powdered coal—Dr. B. Ghosh, College of Engineering & Technology Jadavpur.
Grant asked for :	Equipment : Nil Contingencies : Rs. 1,500 Staff : Rs. 3,180 Total : Rs. 4,680 (including allowances)
	Dr. Lahiri stated that majority of items of work covered by Dr. Ghosh were already being done at the Fuel Research Institute where investigations had been undertaken on a much larger scale.
	The Committee recommended that the grant asked for, namely Rs. 4,680/- be sanctioned. The Committee further recommended that the Director, F. R. I. should have a personal discussion with Dr. Ghosh and reorient the programme of his work so that the work was mainly devoted to fundamental problems of research.

Recommendations of the Committee of the Board	Recommendations of the Board
77. 2 p. 279 The Committee recommended the following grant for continuance of the research scheme on Palaeobotanical investigation of Indian coals during 1955-56: Equipment Nil Contingencies Rs. 1,500 Staff. (1 SRA, 2 JRAS, 1 Mechanic). Rs. 11,857 (including allowances) Total: Rs. 13,357 " " 77. 3 p. 279 The Committee recommended the following grant for continuance of the research scheme on Mechanism of Explosions by Dr. N. R. Tawde, during 1955-56. Equipment Nil Contingencies Rs. 1,000 Staff Rs. 6,580 (including allowances). Total: Rs. 7,580 " " It was also recommended that Dr. Tawde be requested to submit a report as desired by the Research Committee. 77. 4 p. 279 The Committee recommended the following grant for continuance of the research scheme on Combustion of powdered coal during 1955-56. Equipment Nil Contingencies Rs. 1,000 Staff Rs. 3,120 (including allowances). Total: Rs. 4,120 " " The Committee also recommended that Dr. B. Ghosh be requested to reorient the programme as indicated by the Research Committee.	77. 2 p. 279 The Board endorsed the recommendation of its Committee. 77. 3 p. 279 The Board endorsed the recommendations of its Committee. 77. 4 p. 279 The Board endorsed the recommendations of its Committee.

Item No.	Particulars
77.5	Pilot plant investigations on briquetting of non-coking coals—Hyderabad Laboratories. Grant asked for : Equipment : Rs. 15,000 Contingencies : Rs. 3,000 Staff : Rs. 10,529 Total : Rs. 28,529 (including allowances) The Committee recommended that the renewal grant asked for, namely, Rs. 28,529 be sanctioned. The Committee scrutinised the equipment asked for and went into the details of the increased staff required for the work. The Committee felt that these were required for the efficient work of the scheme and recommended them.
77.6	Systematic survey of the coalfields of Hyderabad State—Central Laboratories, Hyderabad. Grant asked for : Equipment : Rs. 15,000 Contingencies : Rs. 5,000 Staff : Rs. 52,008 Total : Rs. 72,008 (including allowances) The Committee considered this item along with Dr. Zaheer's proposal for a permanent Coal Survey Station at Hyderabad. Dr. Lahiri mentioned that the proposal for a Coal Survey Station at Hyderabad to include parts of Madhya Pradesh had been considered by the Regional Coal Survey Committee at Bilaspur where the Chairman of the Survey Committee and the representatives of the M. P. Govt. strongly objected to the coal areas in M. P. to be included in the Hyderabad Organisation for survey. Dr. Lahiri also pointed out that originally the C. S. I. R. sanctioned the Hyderabad coal survey scheme with the object of including the lignite areas in the South. Dr. Krishnan pointed out that apart from the lignite deposits of South Arcot, it was likely that there were other lignite bearing areas in the South. He felt that there was definitely a need for a separate Coal Survey Station for South India, and in his opinion it would be best located at Hyderabad where there were other facilities for fuel research, and which was also at present the headquarters of the Southern Circle of the Geological Survey of India. The Committee thought that the Coal Survey Station at Hyderabad should function under the Fuel Research Institute as a part of the Coal Survey Organisation already in operation. The Committee recommended that at present the scheme should continue on the existing basis. The additional staff of one more Senior Scientific Assistant and four Khalasis be sanctioned, pending the establishment of a F.R.I. Coal Survey Station at Hyderabad. The grant asked for under the items Equipment and Contingencies should also be sanctioned.

Recommendations of the Committee of the Board	Recommendations of the Board
77.5 p. 281 The Committee recommended the following grant for continuance of the research scheme on Briquetting of non-coking coals during 1955-56 Equipment Nil Contingencies. Rs. 2,000 Staff. (1 JRA & 1 Mechanic). Rs. 5,414 (including allowances). Total: Rs. 7,414 " " The Committee also recommended that the Hyderabad Laboratories be requested to provide the capital equipment needed for the work.	77.5 p. 281 The Board endorsed the recommendations of its Committee.

RENEWALS

Item No.	Particulars
	The Committee further recommended that the Director, F. R. I. should approach the C. S. I. R. for sanction of funds and staff for the creation of a permanent Coal Survey Station to be located at Hyderabad and which would survey the fuel resources of Chanda coalfields of M. P., the Godarwari coalfields of Hyderabad and the Lignite and Peat deposits of South India.
78	Subject : Internal combustion engines research schemes (renewals) Note : 78.0 The Internal Combustion Engines Research Committee (Chairman : Dr. J. C. Ghosh) met on January 2, 1955. The Committee reviewed the progress in the various research schemes and made recommendation regarding their renewal. 78.1 Development of heavy duty parts of internal combustion engines by Prof. Havemann, Indian Institute of Science, Bangalore. Crankshafts manufactured out of three different varieties of cast iron were tested dynamically under actual working conditions and would also be tested on a vibrophore for fatigue. Test bars made of the same materials would be tested to ascertain their physical properties, like tensile strength, hardness etc. The Committee noted that for the time being, work was not being extended to other parts. The Chairman expressed his disappointment over the fact that the results obtained out of such investigations were merely going to waste instead of being beneficially utilised and said that perhaps some industrial firm could be given a small grant to continue work on other parts. Dr. Ghatage pointed out that industrialists are not at all enthusiastic about investigations of this nature going on in the country and that in case they encountered manufacturing difficulties they generally preferred to import such parts from abroad. The Chairman felt that it would be worthwhile attempting to persuade at least some automobile firms to take advantage of the results obtained under this scheme. The Committee recommended that the 'Materials Report' which was being got ready, should be circulated to firms like the Premier Automobiles, the Hindustan Motors etc., and that after ascertaining the response from these organisations, some of their experts may be invited to participate into discussions and to consider the taking up of definite proposals.

Recommendations of the Committee of the Board	Recommendations of the Board								
77, 6 p. 281-283 The Committee recommended the renewal of the scheme on 'Survey of Hyderabad Coalfields' with the following grant for 1955-56: <table> <tr> <td>Equipment</td><td>Rs. 10,000</td></tr> <tr> <td>Contingencies</td><td>Rs. 5,000</td></tr> <tr> <td>Staff</td><td>Rs. 22,886 (including allowances)</td></tr> <tr> <td>Total:</td><td>Rs. 37,886 " "</td></tr> </table>	Equipment	Rs. 10,000	Contingencies	Rs. 5,000	Staff	Rs. 22,886 (including allowances)	Total:	Rs. 37,886 " "	77, 6 p. 281-283 The Board endorsed the recommendation of its Committee.
Equipment	Rs. 10,000								
Contingencies	Rs. 5,000								
Staff	Rs. 22,886 (including allowances)								
Total:	Rs. 37,886 " "								
78, 0 p. 283 The Committee noted.	78, 0 p. 283 The Board noted.								

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Item No.	Particulars
	Since no renewal application had been received, this scheme would be terminated by the end of the financial year.
78.2	Hot air engines and their development by Prof. Havemann, Indian Institute of Science, Bangalore. Grant asked for : Equipment : Rs. 7,500 plus unspent balance Rs. 10,000 Contingencies : Rs. 1,000 Staff : Rs. 6,644 Total Rs. 15,194 (including allowances) plus unspent balance The aim of the scheme was to collect fundamental data concerning the design of hot air engines. The analysis of the thermodynamics of the cycle had been substantially completed. As for the experimental part of the scheme, the rate of heat transfer in oscillating gases had been taken up first for investigation ; the aim being to establish the correlation between characteristic quantities of the gas flow and its oscillation with the rate of heat transferred to the wall of a pipe. The other new phenomenon encountered was the design of the ejector. Since this investigation had no precedent, a fundamental approach to the problem of correlation between the forcing medium and its oscillations in regard to mass flow, velocity, pressure, amplitude and frequency of oscillations, in its relation to the gaseous forced medium dependent on the design of the ejector was to be made. The Committee recommended the following grant : Equipment ... Rs. 7,500/- plus the unspent balance Rs. 10,000/- Contingencies : ... Rs. 1,000/- Staff : 1. S. R. A. in the place of 1 J. R. A. (in order to attract and retain competent a man.) 1. Statistical Assistant. 1. Mechanic. 78.3 Design and development of an air-cooled aero-otto engine by Prof. Havemann, Indian Institute of Science, Bangalore. Prof. Havemann stated that the design of the single cylinder prototype had been completed and working drawing for the major component assemblies were ready. The complete unit was being fabricated in wood to serve as a mock-up for the finalisation of the design details. By the end of the current financial year the design study as such would be terminated.

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Recommendations of the Committee of the Board	Recommendations of the Board
78. 1 p. 283-285 The Committee noted that the research scheme had since been terminated. It was recommended that a detailed report be prepared and circulated to I. C. Engine Manufacturers in the country.	78. 1 p. 283-285 The Board endorsed the recommendation of its Committee.
78. 2 p. 285 The Committee recommended the following grant for the continuance of the research scheme on 'Hot Air Engines' by Prof. Havemann during 1955-56. Equipment Rs. 7,500 + unspent balance. Contingencies Rs. 1,000 Staff Rs. 6, 684 (including allowances). Total. Rs. 15,184 plus "unspent balance."	78. 2 p. 285 The Board endorsed the recommendation of its Committee.

Item No.	Particulars										
	The next stage was the manufacture of the prototype. Dr. Ghatage pointed out that whereas the investigators brought their schemes upto the design stage, further progress was being arrested owing to the lack of interested parties to undertake manufacture. In spite of jet engines the proposed 160 HP six cylinder engine would hold its own in the field of air transport for another 20 years—the piston engine being more suited for short distance flight than the jet engine. Also, this type of engine would find application in mechanised tanks. The Committee recommended that the C. S. I. R. may be requested to take up this development work on a pilot-plant basis. No renewal application had been received. The future progress of this scheme would be determined by the outcome of the efforts that were being taken to get the single cylinder prototype manufactured. 78.4 Development of gas turbine and jet propulsion units at the Bengal Engineering College, Howrah. <table> <tr> <td>Grant asked for : Equipment : Nil</td> <td>Contingencies : Rs. 10,000</td> </tr> <tr> <td>Staff : Rs. 19,580</td> <td>Total : Rs. 29,580 (including allowances)</td> </tr> </table> The Chairman stated that though Dr. Sen Gupta was now at Kharagpur he was continuing to take active interest in the progress of the scheme. Detailed programmes had been drawn up for the exchange of staff between the Bengal Engineering College and the Indian Institute of Technology and that their proximity to each other was being taken advantage of. The Committee recommended that since the exact nature and scope of the work to be carried out at the Bengal Engineering College (and the Indian Institute of Science) was receiving the attention of the Committee on Gas Turbine & Jet Population Engines the renewal application be kept in abeyance pending the final decision taken by the C. S. I. R. in this matter. 78.5 Development of free piston compressors by Prof. Nandeeswaraya, Indian Institute of Technology, Kharagpur. <table> <tr> <td>Grant asked for : Equipment : Rs. 2,000 plus unspent balance</td> <td></td> </tr> <tr> <td>Contingencies : Rs. 350</td> <td>Staff : Rs. 5,664</td> </tr> <tr> <td colspan="2">Total Rs. 6,014 (including allowances) plus unspent balance</td> </tr> </table> Pending the procurement of the Pescara Muty Free Piston Compressor No. 1 by the Indian Institute of Technology, the funds sanctioned for the year 1954-55 had not been placed at the disposal of the investigator.	Grant asked for : Equipment : Nil	Contingencies : Rs. 10,000	Staff : Rs. 19,580	Total : Rs. 29,580 (including allowances)	Grant asked for : Equipment : Rs. 2,000 plus unspent balance		Contingencies : Rs. 350	Staff : Rs. 5,664	Total Rs. 6,014 (including allowances) plus unspent balance	
Grant asked for : Equipment : Nil	Contingencies : Rs. 10,000										
Staff : Rs. 19,580	Total : Rs. 29,580 (including allowances)										
Grant asked for : Equipment : Rs. 2,000 plus unspent balance											
Contingencies : Rs. 350	Staff : Rs. 5,664										
Total Rs. 6,014 (including allowances) plus unspent balance											

78, 3 p. 285-287

The Committee noted that the scheme had been terminated since the initial programme of work of designing an aero-otto engine had been completed.

The Committee recommended that the Research Committee be requested to examine the results obtained and make specific proposals on the developmental aspects.

78. 4 p. 287

The Committee recommended that pending detailed consideration of the Tata Committee Report, the research scheme on development of gas turbine at the Bengal Engineering College be continued with the present staff. The DSIR may take necessary action departmentally to provide the grants needed for this purpose.

78. 3 p. 285-287

The Board noted and endorsed the recommendation of its Committee.

78. 4 p. 287

The Board endorsed the recommendation of its Committee.

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Item No.	Particulars													
	The Committee recommended that the following grant be sanctioned : <table><tr><td>Equipment</td><td>...</td><td>Unspent balance of Rs. 2,000/-</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 1,000/-</td></tr><tr><td>Staff</td><td>...</td><td>1 S.R.A. & 1 Senior Lab. Asstt.</td></tr></table>	Equipment	...	Unspent balance of Rs. 2,000/-	Contingencies	...	Rs. 1,000/-	Staff	...	1 S.R.A. & 1 Senior Lab. Asstt.				
Equipment	...	Unspent balance of Rs. 2,000/-												
Contingencies	...	Rs. 1,000/-												
Staff	...	1 S.R.A. & 1 Senior Lab. Asstt.												
78.6	Development of auto engines for using alcohol as fuel by Bengal Engineering College, Howrah. <table><tr><td>Grant asked for : Equipment : Rs. 5,000</td><td>Contingencies : Rs. 2,000</td></tr><tr><td>Staff : Rs. 1,830</td><td>Total : Rs. 8,830 (including allowances)</td></tr></table> The Committee recommended the following grant : <table><tr><td>Equipment</td><td>...</td><td>Rs. 7,000/- originally sanctioned, plus Rs. 2000/- additional for the high speed indicator.</td></tr><tr><td>Contingencies</td><td>...</td><td>Rs. 2,000/-</td></tr><tr><td>Staff</td><td>...</td><td>1 Mechanic</td></tr></table>	Grant asked for : Equipment : Rs. 5,000	Contingencies : Rs. 2,000	Staff : Rs. 1,830	Total : Rs. 8,830 (including allowances)	Equipment	...	Rs. 7,000/- originally sanctioned, plus Rs. 2000/- additional for the high speed indicator.	Contingencies	...	Rs. 2,000/-	Staff	...	1 Mechanic
Grant asked for : Equipment : Rs. 5,000	Contingencies : Rs. 2,000													
Staff : Rs. 1,830	Total : Rs. 8,830 (including allowances)													
Equipment	...	Rs. 7,000/- originally sanctioned, plus Rs. 2000/- additional for the high speed indicator.												
Contingencies	...	Rs. 2,000/-												
Staff	...	1 Mechanic												
78.7	Development of flash steam generator The scheme was terminated with effect from the 31st March, 1954. However, the investigator was allowed to utilise the unspent balance of the grant made for the year 1953-54 (Rs. 2,700) in order to complete the work on hand. The time limit was first fixed at 30.9.54 and later extended to 31.3.55. An application received from Shri R. K. Mukherji for re-consideration was considered. It was doubted if continued and sustained interest would be shown by the investigator in persuing this development work. The Committee was of the opinion that further financial assistance for this scheme would not be justifiable. The investigator was requested to give the C S. I. R. a full report of the work done up-to-date.													
79	Subject : Chemical research schemes (renewals) Note : 79.0 The Chemical Research Committee in its meeting held on January 3, 1955 recommended continuance of the following research schemes during 1955-56. 79.1 Studies in the synthesis, constitution and dyeing properties of dyes with special													

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Recommendations of the Committee of the Board	Recommendations of the Board																
78.5 p. 287-289 The Committee recommended continuance of the research scheme on 'Free piston compressors' by Dr. Nandeeswaraiya with the following grant : <table> <tr> <td>Equipment</td><td>Unspent balance</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff</td><td>Rs. 5,664 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 6,664 ,, ,,</td></tr> </table> 78.6 p. 289 The Committee recommended the following grant for continuance of the research scheme on 'Auto-engine for using Power Alcohol as Fuel' by Prof. Fairbairn. <table> <tr> <td>Equipment</td><td>Rs. 2,000 plus unspent balance</td></tr> <tr> <td>Contingencies</td><td>Rs. 2,000</td></tr> <tr> <td>Staff</td><td>Rs. 1,830 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 5,830 ,, plus unspent balance</td></tr> </table> 78.7 p. 289 The Committee noted that the research scheme has since been terminated. It was recommended that Mr. Mukherjee be requested to submit a detailed final report. 79.0 p. 289 The Committee noted.	Equipment	Unspent balance	Contingencies	Rs. 1,000	Staff	Rs. 5,664 including allowances	Total	Rs. 6,664 ,, ,,	Equipment	Rs. 2,000 plus unspent balance	Contingencies	Rs. 2,000	Staff	Rs. 1,830 including allowances	Total	Rs. 5,830 ,, plus unspent balance	78.5 p. 287-289 The Board endorsed the recommendation of its Committee. 78.6 p. 289 The Board endorsed the recommendation of its Committee. 78.7 p. 289 The Board noted and endorsed the recommendation of its Committee. 79.0 p. 289 The Board noted.
Equipment	Unspent balance																
Contingencies	Rs. 1,000																
Staff	Rs. 5,664 including allowances																
Total	Rs. 6,664 ,, ,,																
Equipment	Rs. 2,000 plus unspent balance																
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Staff	Rs. 1,830 including allowances																
Total	Rs. 5,830 ,, plus unspent balance																

Item No.	Particulars
	reference to anthra-quinonoid and sulphurized vat dyes by Dr. K. Venkataraman, Bombay.
	Grant asked for : Equipment : Nil Contingencies : Rs. 4,800 Staff : Rs. 14,565 Total : Rs. 19,365 (including allowances)
	In view of the development in the Indian dyestuff industry, it was desirable to maintain at least one school of research in the chemistry of synthetic dyes.
79.2	Preparation of research chemicals for India by the National Chemical Laboratory, Poona.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,500 Staff : Rs. 13,432 Total : Rs. 14,932 (including allowances)
	The scheme was for the benefit of research institutions in India and that the scheme should be continued until a private body is prepared to accept the responsibility of preparing and supplying research chemicals. The National Chemical Laboratory may consider the desirability of making this activity a permanent part of their organization and place the matter before their Advisory Board.
79.3	Stereochemical studies in the cycloheptane series by Dr. G. S. Saharia, Delhi.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 3,420 Total : Rs. 4,420 (including allowances)
79.4	Investigation on the economic utilization of tamarind seed by Dr. A. N. Puri, Dr. G. M. Nabar and Dr. J. G. Kane, Bombay.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,200 Staff : Nil Total : Rs. 1,200 (including allowances)
79.5	Mutual solubilities of oil and water by Prof. S. R. Palit, Calcutta.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 3,060 Total : Rs. 4,060 (including allowances)
79.6	Investigation on the electrochemical properties of resin systems in relation to reactions involving exchange of ions by Dr. B. N. Ghosh, Calcutta.
	Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 3,311 Total : Rs. 4,311 (including allowances)
79.7	Studies in stereochemistry by Dr. Bawa Kartar Singh, Banaras.
	Grant asked for : Equipment : Rs. 500 Contingencies : Rs. 1,000 Staff : Rs. 3,327 Total : Rs. 4,827 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board
79. 1 p. 289-291 The Committee recommended the continuance of the research scheme on 'Anthraquinonoid and sulphurized vat dyes' by Dr. K. Venkataraman, with the following grant : Equipment Nil Contingencies Rs. 4,000 Staff (4 JRAs) Rs. 14,056 including allowances Total Rs. 18,056 " "	79. 1 p. 289-291 The Board endorsed the recommendation of its Committee.
79. 2 p. 291 The Committee recommended the following grant for continuance of the research scheme on 'Preparation of research chemicals' during 1955-56. Equipment Nil Contingencies Rs. 500 Staff (as at present) Rs. 9,400 including allowances Total Rs. 9,900 " "	79. 2 p. 291 The Board endorsed the recommendation of its Committee.
79. 3-79. 6 p. 291 The Committee recommended the continuance of the research schemes with the grants indicated against each. 79. 3 Cycloheptane series—Dr. G. S. Saharia. Equipment Nil Contingencies Rs. 1,000 Staff (1 JRA) Rs. 3,020 including allowances Total Rs. 4,020 " "	79. 3 p. 291 The Board endorsed the recommendation of its Committee.
79. 4 Utilization of tamarind seeds—Dr. A. N. Puri. Equipment Nil Contingencies Rs. 1,000 Staff (1 JRA) Rs. 3,293 including allowances Total Rs. 4,293 " "	79. 4 p. 291 The Board endorsed the recommendation of its Committee.
79. 5 Mutual solubilities of oil and water—Prof. S. R. Palit. Equipment Nil Contingencies Rs. 1,000 Staff (1 JRA) Rs. 3,090 including allowances Total Rs. 4,090 " "	79. 5 p. 291 The Board endorsed the recommendation of its Committee.
79. 6 Electrochemical properties of resin systems—Dr. B. N. Ghosh. Equipment Nil Contingencies Rs. 1,000 Staff (1 JRA) Rs. 3,310 including allowances Total Rs. 4,310 " "	79. 6 p. 291 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
	The scheme has started functioning since November 1954 and good progress has been made. Equipment grant of Rs. 500/- asked for may be sanctioned.
79.8	Dissociation and decomposition of ammonium sulphate and its substitution in processes involving sulphuric acid by Dr. D. K. Patwardhan, Banaras. Grant asked for : Equipment : unspent balance Contingencies : Rs. 500 Staff : Nil Total : Rs. 500+unspent balance
79.9	Thermodynamic properties of mixtures by Dr. R. P. Rastogi, Lucknow. Grant asked for : Equipment Rs. 5,000 Contingencies : Rs. 1,000 Staff : Rs. 3,000 Total : Rs. 9,000 (including allowances) Grant of Rs. 5000/- for the refractometer was not recommended.
79.10	Atomization of fluids by Dr. M. Narsinga Rao, Waltair. Grant asked for : Equipment : Rs. 9,500 Contingencies : Rs. 1,500 Staff : Rs. 6,240 Total : Rs. 17,240 (including allowances) Dr. Narsinga Rao's request for additional grant of Rs. 9500/- and additional staff was not recommended.
79.11	Investigation on veratrum alkaloids by Dr. B. K. Bhattacharya, College of Engineering & Technology, Calcutta. Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 5,561 Total : Rs. 6,561 (including allowances)
79.12	Application of free radical reactions in the synthesis of organic medicinals by Dr. K. B. L. Mathur, Delhi. Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 2,940 Total : Rs. 3,940 (including allowances)
79.13	Investigation of the possibilities for a system of qualitative chemical analysis based on calcium sulphate and chalk crayon chromatography by Prof. B. N. Sen, Burdwan. Grant asked for : Equipment : Rs. 1,600 Contingencies : Rs. 3,000 Staff : Rs. 3,120 Total : Rs. 7,720 (including allowances) The additional grant of Rs. 1600/- asked for was not recommended.

79. 7 p. 291-293

The Committee recommended continuance of the research scheme on Stereochemistry by Dr. Bawa Kartar Singh with the following grant :

Equipment	Rs.	500	
Contingencies	Rs.	1,000	
Staff (1 JRA)	Rs.	3,319 including allowances	

Total Rs. 4,819 " "

79. 8-79. 13 p. 293

The Committee recommended continuance of the following research scheme during 1955-56 and sanction of the grants indicated against each.

79. 8 Substitution of sulphuric acid—by Dr. D.K. Patwardhan.

Equipment	Unspent balance from 1954-55.		
Contingencies	Rs.	500	
Staff	Nil		

Total Rs. 500 plus unspent balance.

79. 9 Thermodynamic properties of mixtures—
Dr. R. P. Rastogi.

Equipment	Nil		
Contingencies	Rs.	1,000	
Staff (1 JRA)	Rs.	2,985 including allowances	

Total Rs. 3,985 " "

79. 10 Atomization of fluids—Dr. M. Narasinga Rao

Equipment	Nil		
Contingencies	Rs.	1,000	
Staff (1 JRA)	Rs.	2,740 including allowances	

Total Rs. 3,740 " "

79. 11 Veratrum alkaloids—Dr. B. K. Bhattacharya.

Equipment	Nil		
Contingencies	Rs.	1,000	
Staff (1 JRA)	Rs.	4,412 including allowances	

Total Rs. 5,412 " "

79. 12 Free radical reactions in the synthesis of organic medicinals—Dr. K. B. L. Mathur.

Equipment	Nil		
Contingencies	Rs.	1,000	
Staff (1 JRA)	Rs.	2,964 including allowances	

Total Rs. 3,964 " "

79. 13 Chalk crayon chromatography—Prof. B.N. Sen.

Equipment	Nil		
Contingencies	Rs.	1,000	
Staff (1 JRA)	Rs.	2,655 including allowances	

Total Rs. 3,655 " "

79. 7 p. 291

The Board endorsed the recommendation of its Committee.

79. 8 p. 293

The Board endorsed the recommendation of its Committee.

79. 9 p. 293

The Board endorsed the recommendation of its Committee.

79. 10 p. 293

The Board endorsed the recommendation of its Committee.

79. 11 p. 293

The Board endorsed the recommendation of its Committee.

79. 12 p. 293

The Board endorsed the recommendation of its Committee.

79. 13 p. 293

The Board endorsed the recommendation of its Committee.

Item No.	Particulars
80	Subject : Pharmaceuticals & drugs research schemes (renewals) Note : 80.0 The Pharmaceuticals & Drugs Research Committee in its meeting held on February 6, 1955 in New Delhi considered the progress reports of the research schemes and recommended their continuance during 1955-56. 80.1 Investigation of Indian cardiac drugs by Prof. S. Rangaswami, Waltair. Grant asked for : Equipment : Nil Contingencies : Rs. 2,000 Staff : Rs. 5,440 Total : Rs. 7,440 (including allowances) Certain compounds had been isolated which gave encouraging results on biological testing. The Committee recommended the continuance of the scheme for one year with the present staff and Rs. 2000/- for contingencies. 80.2 Biological studies in malarial parasites by Dr. U. P. Basu, Calcutta. Grant asked for : Equipment : Nil Contingencies : Rs : 500 Staff : Rs. 5,271 Total : Rs. 5,771 (including allowances) Letter received from Dr. U. P. Basu was also considered. The scheme was recommended for one year only. 80.3 Chemical investigation of Indian lichens and antibiotics from heart woods by Prof. T. R. Seshadri, Delhi. Grant asked for : Equipment : Rs. 700 Contingencies : Rs. 2000 plus Rs. 500 for tour Staff : Rs. 10,775 Total : Rs. 13,975 (including allowances) Prof. Seshadri pointed out that a large collection of lichens from all over the country had been made for study. Ten compounds were sent for the assay of their antibiotic properties and brazilin and usnic acid had given the most promising results. Since this type of investigation would require many years, it was suggested that it be continued as a University activity. It was recommended that Delhi University should provide the facilities for carrying on the work and if necessary the University Grants Commission may be approached for funds. The Committee in the meanwhile recommended continuance of the scheme for the year 1955-56.

Recommendations of the Committee of the Board	Recommendations of the Board																								
80. 0 p. 295 The Committee noted. 80. 1, 80. 2 and 80. 3 p. 295 The Committee recommended the continuance of the following research schemes during 1955-56 with grants indicated against each: 80. 1 Cardiac drugs—Prof. S. Rangaswami. <table> <tr><td>Equipment</td><td>Nil</td></tr> <tr><td>Contingencies</td><td>Rs. 1,200</td></tr> <tr><td>Staff (1 JRA)</td><td>Rs. 3,157 including allowances</td></tr> <tr><td>Total</td><td>Rs. 4,357 " "</td></tr> </table> 80. 2 Malarial parasites—Dr. U. P. Basu. <table> <tr><td>Equipment</td><td>Nil</td></tr> <tr><td>Contingencies</td><td>Rs. 500</td></tr> <tr><td>Staff</td><td>Rs. 5,270 including allowances</td></tr> <tr><td>Total</td><td>Rs. 5,770 " "</td></tr> </table> The Committee recommended completion of the scheme during 1955-56. 80. 3 Indian lichens, etc.—Prof. T. R. Seshadri <table> <tr><td>Equipment</td><td>Rs. 700</td></tr> <tr><td>Contingencies</td><td>Rs. 2,000</td></tr> <tr><td>Staff</td><td>Rs. 11,022 including allowances</td></tr> <tr><td>Total</td><td>Rs. 13,722 " "</td></tr> </table> It was also recommended that the Delhi University may take up this work as a part of their regular research programme.	Equipment	Nil	Contingencies	Rs. 1,200	Staff (1 JRA)	Rs. 3,157 including allowances	Total	Rs. 4,357 " "	Equipment	Nil	Contingencies	Rs. 500	Staff	Rs. 5,270 including allowances	Total	Rs. 5,770 " "	Equipment	Rs. 700	Contingencies	Rs. 2,000	Staff	Rs. 11,022 including allowances	Total	Rs. 13,722 " "	80. 0 p. 295 The Board noted. 80. 1 p. 295 The Board endorsed the recommendation of its Committee. 80. 2 p. 295 The Board endorsed the recommendation of its Committee. 80. 3 p. 295 The Board endorsed the recommendation of its Committee.
Equipment	Nil																								
Contingencies	Rs. 1,200																								
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Total	Rs. 13,722 " "																								

Item No.	Particulars
80.4	Chemical investigation of Indian medicinal plants with special reference to Rauwolfia species by Dr. (Mrs) Asima Chatterjee, Calcutta.
	Grant asked for : Equipment : Rs. 3,500 Contingencies : Rs. 3,500 Staff : Rs. 6,485 Total : Rs. 13,485 (including allowances)
	The Committee noted that Vinca rosea was being investigated at Trivandrum. Teddalia aculeata and Aegle marmelos were under investigation at the Antibiotic Research Centre. The new scheme put up by the investigator was, therefore, not recommended.
	The Committee recommended the existing scheme with the present staff and Rs. 3,500/- for equipment and Rs. 3,000/- for contingent expenses.
	The Committee also recommended the equipment grant as a special case. As a rule it is expected that equipment needed for the work would be supplied by the Institution where the work was in progress.
	It was further suggested that Dr. (Mrs) Chatterjee should contact Father Santapau, the Chief Botanist, Botanical Survey of India, stationed in Calcutta, regarding the supply of Rauwolfia.
80.5	Compilation of a brochure on indigenous drugs of India by Dr. B. Mukerji, Lucknow.
	Grant asked for : Equipment : Nil Contingencies : Rs. 300 Staff : Rs. 6,567 Total Rs. 6,867 (including allowances)
	Dr. Mukerji assured that he would do his best to finish the work during 1955-56. The Chairman, however, wanted that attempts should be made to send the manuscript to the press by August, 1955.
80.6	Antibiotics Research Centre by Col. S. S. Bhatnagar, Bombay.
	Grant asked for : Equipment : Rs. 4,000 Contingencies : Rs. 5,000 Staff : Rs. 15,051 Total : Rs. 24,051 (including allowances)
	Col. S. S. Bhatnagar pointed out that a larger number of samples of soil had been screened and attempts were being made to produce one or two of the antibiotics isolated, on a large scale in collaboration with the National Chemical Laboratory.
	The Committee recommended the continuance of the scheme with the grant asked for.

Recommendations of the Committee of the Board	Recommendations of the Board
80, 4 p. 297 The Committee recommended the following grant for continuance of the research scheme on "Rauwolfia species" by Dr. (Mrs.) A. Chatterjee. Equipment Rs. 3,500 Contingencies Rs. 1,500 Staff Rs. 3,735 including allowance Total Rs. 8,735 " "	
It was also recommended that the Chief Botanist, Botanical Survey of India be requested to supply samples of Rauwolfia to Dr. Chatterjee.	80, 4 p. 297 The Board endorsed the recommendations of its Committee.
80.5 p. 297 The Committee recommended continuance of the scheme on 'Brochure on indigenous drugs'—Dr. B. Mukerji, with the following grant: Equipment Nil Contingencies Rs. 300 Staff Rs. 6,625 including allowances Total Rs. 6,925 " "	80, 5 p.297 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
	The Chairman suggested that this work could perhaps be better carried out at the Research Laboratories of the Indian Penicillin Committee at Pimpri. He would investigate the possibilities during his next visit to Pimpri. 80.7 Microbiological Research Centre by Col. S. S. Bhatnagar, Bombay. Grant asked for : Equipment : Rs. 2,000 Contingencies : Rs. 5,000 Staff Rs. 12,227 Total : Rs. 19,227 (including allowances) Testing of compounds received from various laboratories and research on plant antibiotics was in progress. The Committee felt that a circular should be sent to the Universities and other research institutions in the country informing them of the facilities available at the Microbiological Research Centre for testing of potential antibiotics. The Committee recommended the continuance of the microbiological centre. 80.8 Studies on the production of antibiotic substances from Streptomyces spp. by Dr. P. N. Nandi, Calcutta. Grant asked for : Equipment : Rs. 3,500 Contingencies : Rs. 1,200 Staff : Rs. 7,874 Total : Rs. 12,574 (including allowances) The Committee recommended continuance of the scheme. 80.9 Screening of antimalarial drugs by Col. Jaswant Singh, Delhi. Grant asked for : Equipment : Nil Contingencies : Rs. 7,000 Staff : Rs. 10,500 Total : Rs. 17,500 (including allowances) It was suggested that testing of compounds, already investigated, or whose structures would not justify the claim of their being antimalarial, should be avoided. 80.10 Biological assaying of insecticides by Col. Jaswant Singh, Delhi. Grant asked for : Equipment : Rs. 7,000 Contingencies : Rs. 2,500 Staff : Rs. 8,800 Total : Rs. 18,300 (including allowances) P-nitrophenyl-o-o-diethyl phosphate, diethoxy phosphoric acid ester of 4 methyl umbelliferone and tetra ethyl phosphate had given particularly encouraging results. The Committee suggested that investigations should be carried on wetting agents which act as boosters when used along with insecticides like T. E. P. P. 80.11 Polyvaccine for cholera, typhoid and dysentery by Dr. S. P. Gupta, Lucknow. Grant asked for : Equipment : unspent balance Contingencies : Rs. 2,000 Staff : Rs. 13,329 Total : Rs. 15,329 (in. a.) + unspent balance

Recommendations of the Committee of the Board	Recommendations of the Board																																								
80. 6 p. 297-299 The Committee recommended the following grant for continuance of the research scheme on 'Antibiotic research' by Col. S.S. Bhatnagar during 1955-56. <table> <tr> <td>Equipment</td><td>Rs. 4,000</td></tr> <tr> <td>Contingencies</td><td>Rs. 4,000</td></tr> <tr> <td>Staff</td><td>Rs. 15,050 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 23,050 " "</td></tr> </table> It was also recommended that the Chairman of the Research Committee be requested to examine the possibility of carrying out this work in the Research Laboratories of the Pimpri Factory. 80. 7, 80. 8, 80. 9 & 80. 10 p. 299 The Committee recommended the following renewal grants for continuance of the research schemes: 80. 7 Microbiological research—Col. S. S. Bhatnagar. <table> <tr> <td>Equipment</td><td>Rs. 2,000</td></tr> <tr> <td>Contingencies</td><td>Rs. 3,000</td></tr> <tr> <td>Staff</td><td>Rs. 12,227 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 17,227 " "</td></tr> </table> 80. 8 Antibiotic substances from Streptomyces—Dr. P.N. Nandi. <table> <tr> <td>Equipment</td><td>Unspent balance</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff</td><td>Rs. 7,987 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 8,987 " "</td></tr> </table> 80. 9 Antimalarial drugs—Col. Jaswant Singh <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 5000</td></tr> <tr> <td>Staff</td><td>Rs. 10,236 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 15,236 " "</td></tr> </table> 80. 10 Biological assaying—Col. Jaswant Singh. <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 2,000</td></tr> <tr> <td>Staff</td><td>Rs. 8,800 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 10,800 " "</td></tr> </table> The Committee recommended that research on boosters should also be undertaken in the scheme.	Equipment	Rs. 4,000	Contingencies	Rs. 4,000	Staff	Rs. 15,050 including allowances	Total	Rs. 23,050 " "	Equipment	Rs. 2,000	Contingencies	Rs. 3,000	Staff	Rs. 12,227 including allowances	Total	Rs. 17,227 " "	Equipment	Unspent balance	Contingencies	Rs. 1,000	Staff	Rs. 7,987 including allowances	Total	Rs. 8,987 " "	Equipment	Nil	Contingencies	Rs. 5000	Staff	Rs. 10,236 including allowances	Total	Rs. 15,236 " "	Equipment	Nil	Contingencies	Rs. 2,000	Staff	Rs. 8,800 including allowances	Total	Rs. 10,800 " "	80. 6 p. 297-299 The Board endorsed the recommendations of its Committee. 80. 7 p. 299 The Board endorsed the recommendation of its Committee. 80. 8 p. 299 The Board endorsed the recommendation of its Committee. 80. 9 p. 299 The Board endorsed the recommendation of its Committee. 80. 10 p. 299 The Board endorsed the recommendation of its Committee.
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Item No.	Particulars
	The Committee recommended that Dr. S. P. Gupta should first prepare a combined vaccine for typhoid and dysentery and test the efficacy of the vaccine by protection tests. Cholera vaccine may be incorporated later. It was suggested that the work should be brought to a close by the end of 1955-56. 80.12 Cultivation and commercial development of medicinal plants (insecticidal and insect repellent group) of the North Western Himalayan region by Col. R. N. Chopra, Kashmir. Grant asked for : Equipment : Nil Contingencies : Rs. 3,000 Staff : Rs. 9,214 Total : Rs. 12,214 (including allowances) The Committee recommended continuance of the scheme and also recommended that the next meeting of the Committee should be held in Kashmir to enable the members to see the cultivation of medicinal plants being carried on in the farms. 80.13 Investigation of economical and medicinal plants of Ladakh by Col. R. N. Chopra, Kashmir. Grant asked for : Equipment : Nil Contingencies : Rs. 1000 Staff : Nil Total : Rs. 1000 (including allowances) The Committee recommended the continuance of the scheme. 80.14 A unit in India for cancer producing and cancer inhibiting substances by Dr. V. R. Khanolkar, Bombay. Grant asked for : Equipment : Nil Contingencies : Rs. 4,000 Staff : Rs. 4,989 Total : Rs. 8,989 (including allowances) 80.15 Pharmacological Research Unit by Prof. Roger A. Lewis, Bombay. Grant asked for : Equipment : Nil Contingencies : Rs. 4,000 Staff : Rs. 10,875 Total : Rs. 14,875 (including allowances) 80.16 Chemical investigation of Indian medicinal plants by Dr. T. R. Govindachari, Madras. Grant asked for : Equipment : Nil Contingencies : Rs. 500 Staff : Rs. 4,020 Total : Rs. 4,520 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board
80. 11 p. 299-301 The Committee recommended that since the results were not encouraging the research scheme on 'Polyvaccine' by Dr. S.P Gupta be brought to a close by the end of August 1955. The following grant was recommended for continuance of the scheme for six months only: Equipment Nil Contingencies Rs. 1,000 Staff Rs. 6,654 including allowances Total Rs. 7,654 " " 80. 12 p. 301 The Committee recommended the following grant for continuance of the scheme on 'Cultivation of medicinal plants' by Col. Chopra during 1955-56: Equipment Nil Contingencies Rs. 2,000 Staff Rs. 9,164 including allowances Total Rs. 11,164 " " It was also recommended that the D.S.I.R. may examine the possibility of holding the next meeting of the Research Committee in Kashmir. 80. 13, 80. 14, 80. 15 & 80. 16 p. 301 The Committee recommended continuance of the following research schemes with the grants mentioned against each: 80. 13—Medicinal plants of Ladakh—Col. Chopra. Contingencies Rs. 1,000 Total Rs. 1,000 " " 80. 14—Cancer producing and inhibiting substances—Dr. V.R. Khanolkar. Equipment Nil Contingencies Rs. 2,000 Staff Rs. 4,924 including allowances Total Rs. 6,924 " " 80. 15—Pharmacological Research Unit—Prof. Roger A. Lewis. Equipment Nil Contingencies Rs. 2,000 Staff Rs. 11,572 including allowances Total Rs. 13,572 " " 80. 16—Medicinal Plants—Dr. T.R. Govindachari. Equipment Nil Contingencies Rs. 500 Staff Rs. 4,154/4/- including allowances Total Rs. 4,654/4/- " "	80. 11 p. 299-301 The Board endorsed the recommendations of its Committee. 80. 12 p. 301 The Board endorsed the recommendations of its Committee. 80. 13 p. 301 The Board endorsed the recommendation of its Committee. 80. 14 p. 301 The Board endorsed the recommendation of its Committee. 80. 15 p. 301 The Board endorsed the recommendation of its Committee. 80. 16 p. 301 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
81	80.17 Study of metabolic degradation products of 8-amino-quinoline by Col. Jaswant Singh, Delhi. Grant asked for : Equipment : 7,000 Contingencies : Rs. 2,000 Staff : Rs. 3,932 Total Rs. 12,932 (including allowances) 80.18 Finding a rich source of stigmasterol and its isolation by Dr. R. N. Chakravarti, Calcutta. The Committee noted that the scheme was to be terminated by the end of the year 1955-55. The investor may be asked to submit a consolidated report on the work done. 80.19 New paths to chloramphenicol by Dr. A. Tyabji, Bombay. Dr. Tyabji is unable to work whole time and the laboratory facilities are not adequate. The Committee therefore recommended that the scheme be terminated.
	Subject : Biochemical research schemes (renewals) Note :
	81.0 The Biochemical Research Committee (Chairman : Dr. V. Subrahmanyam) at its meeting held on January 3, 1955, considered progress of the following research schemes and made recommendations with regard to their renewal.
	81.1 Thyroidal activity of thyro-globulin and other iodoproteins by Dr. P. S. Sarma, Madras.
	Grant asked for : Equipment : Nil Contingencies : Rs. 2,000 Staff : Rs. 8,917 Total : Rs. 10,917 (including allowances)
	The Committee noted that the results obtained with the dairy cattle through the administration of iodoproteins were not very encouraging and that further experiments had been stopped. It was, however, felt that the investigations proposed for the year 1955-56 are of fundamental importance and are likely to yield some useful results. The Committee recommended the renewal of the scheme for one year with the following grant :

Recommendations of the Committee of the Board	Recommendations of the Board								
80. 17 p. 303 The Committee recommended the following grant for continuance of the research scheme on 8-aminoquinolines' by Col. Jaswant Singh, during 1955-56 <table> <tr> <td>Equipment</td><td>Unspent balance</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff</td><td>Rs. 3,915 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 4,915 " "</td></tr> </table>	Equipment	Unspent balance	Contingencies	Rs. 1,000	Staff	Rs. 3,915 including allowances	Total	Rs. 4,915 " "	80. 17 p. 303 The Board endorsed the recommendation of its Committee.
Equipment	Unspent balance								
Contingencies	Rs. 1,000								
Staff	Rs. 3,915 including allowances								
Total	Rs. 4,915 " "								
80. 18 p. 303 The Committee noted that the Research Scheme had since been terminated as recommended by the Research Committee and the investigator asked for a report.	80. 18 p. 303 The Board noted.								
80. 19 p. 303 The Committee noted that the Research Scheme had since been terminated.	80. 19 p. 303 The Board noted.								

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	Equipment ... Nil Contingencies ... Rs. 1,500 Staff : (One S. R. A. & one J. R. A.) Rs. 8,9167 (including allowances) Total ... Rs. 10,417 (including allowances)
	Dr. Sarma undertook to complete the programme during the year after which the scheme may be terminated.
81.2	Nutritive value of canned foodstuffs by Dr. N. G. Magar, Bombay. Grant asked for : Equipment : Nil Contingencies : Rs. 360 Staff : Rs. 3,060 Total : Rs. 3,420 (including allowances)
	In the original programme of work under the scheme, it was also proposed to study the effect of canned mango and guava juices on the mottling of the teeth of the rats. The Committee felt that this work need not be taken up now as it was not very important. The Committee recommended the renewal of the scheme with the advice that the investigator-in-charge should confine his work to canned guavas and mangoes. The study need not be extended to other fruits. The Committee further recommended that the scheme may be terminated at the end of the year.
	The Committee recommended the following grant : Equipment ... Nil Contingencies ... Rs. 360 Staff : (One J. R. A.) ... Rs. 3,060 (including allowances) Total ... Rs. 3,420 (including allowances)
81.3	Microbial production of vitamin B ₁₂ by Dr. S. C. Roy, Calcutta. Grant asked for : Equipment : Rs. 1,000 Contingencies : Rs. 1,000 Staff : Rs. 3,918 Total : Rs. 5,918 (including allowances)
	While appreciating the initial difficulties in investigations of this type, it was felt that the progress made by the investigator was not very encouraging. It was, therefore,

Recommendations of the Committee of the Board	Recommendations of the Board
81. 1 p. 303-305 The Committee recommended the following grant for continuance of the research scheme during 1955-56 only:— Equipment Nil contingencies Rs. 1,000 Staff Rs. 8,096 including allowances Total Rs. 9,096 " "	81. 1 p. 303-305 The Board endorsed the recommendation of its Committee.
81. 2 p. 305 The Committee recommended the continuance of the research scheme on 'Nutritive value of canned foodstuffs' by Dr. Magar with the following grant for 1955-56 only. Equipment Nil Contingencies Rs. 360 Staff Rs. 2,541 including allowances Total Rs. 2,901 " "	81. 2 p. 305 The Board endorsed the recommendation of its Committee.

Item No.	Particulars																								
	agreed that if more promising results could not be obtained during the following year, the scheme may be terminated. The investigator-in-charge was advised to concentrate on the production of vitamin B₁₂ by <i>S. Olivaceus</i> NRRL B-1125 and he should particularly investigate the use of cheap natural resources for the growth media rather than the expensive synthetic media. It was further suggested that results obtained by the present assay technique should be compared to those obtained by more specific techniques, namely the use of (1) <i>Lactobacillus leichmannii</i> 4797 J. Biol. Chem. 184, 211 (1950) (2) <i>Euglena gracilis</i> Proc. Soc. Exp. Biol. Med. 70, 118 (1949) (3) <i>Ochromonas malhamensis</i> Brit. J. Nutrition 7, 299 (1953). The Committee recommended the following grant : <table><tr><td>(a) Equipment</td><td>...</td><td>Nil</td></tr><tr><td>(b) Contingencies</td><td>...</td><td>Rs. 1,000</td></tr><tr><td>(c) Staff : (One J. R. A.)</td><td>...</td><td>Rs. 3,918 (including allowances)</td></tr><tr><td>Total</td><td>...</td><td><u>Rs. 4,918 (including allowances)</u></td></tr></table> 81.4 Fat production by microbial farming by Dr. H. N. De, Indore. <table><tr><td>Grant asked for :</td><td>Equipment : Rs. 500</td><td>Contingencies : Rs. 1,000</td></tr><tr><td></td><td>Staff : Rs. 4,140</td><td>Total : Rs. 5,640 (including allowances)</td></tr></table> The Committee did not recommend the scheme for renewal as it was felt that the work as now conducted would not lead to any finding of fresh scientific interest or practical value. 81.5 Nutritive value of palm gur by Dr. (Mrs.) Kamala Sohoni, Bombay. <table><tr><td>Grant asked for :</td><td>Equipment : Nil</td><td>Contingencies : Rs. 500</td></tr><tr><td></td><td>Staff : Rs. 3,180</td><td>Total : 3,680 (including allowances).</td></tr></table> The Committee noted that the investigator-in-charge had not adhered to the lines of work approved by the Committee and desired that the programme as now approved should be strictly adhered to in the following year. The Committee advised that the work should be confined to items (1) and (2) under the programme of work submitted by the investigator, namely :—(1) To study the effect of supplementation of a low quality	(a) Equipment	...	Nil	(b) Contingencies	...	Rs. 1,000	(c) Staff : (One J. R. A.)	...	Rs. 3,918 (including allowances)	Total	...	<u>Rs. 4,918 (including allowances)</u>	Grant asked for :	Equipment : Rs. 500	Contingencies : Rs. 1,000		Staff : Rs. 4,140	Total : Rs. 5,640 (including allowances)	Grant asked for :	Equipment : Nil	Contingencies : Rs. 500		Staff : Rs. 3,180	Total : 3,680 (including allowances).
(a) Equipment	...	Nil																							
(b) Contingencies	...	Rs. 1,000																							
(c) Staff : (One J. R. A.)	...	Rs. 3,918 (including allowances)																							
Total	...	<u>Rs. 4,918 (including allowances)</u>																							
Grant asked for :	Equipment : Rs. 500	Contingencies : Rs. 1,000																							
	Staff : Rs. 4,140	Total : Rs. 5,640 (including allowances)																							
Grant asked for :	Equipment : Nil	Contingencies : Rs. 500																							
	Staff : Rs. 3,180	Total : 3,680 (including allowances).																							

Recommendations of the Committee of the Board	Recommendations of the Board								
81. 3 p. 305-307 The Committee recommended the following grant for continuance of the research scheme on Microbial production of vitamin B₁₂ by Dr. Roy 'during 1955-56 only: <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. 3,903 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 4,903 " "</td></tr> </table> The Committee also recommended termination of the research scheme if promising results were not forthcoming. 81. 4 p. 307 The Committee noted that the scheme had since been terminated.	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 3,903 including allowances	Total	Rs. 4,903 " "	81. 3 p. 305-307 The Board endorsed the recommendations of its Committee. 81. 4 p. 307 The Board noted.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff	Rs. 3,903 including allowances								
Total	Rs. 4,903 " "								

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Equipment	...	Nil
Contingencies	...	Rs. 500
Staff : (One J. R. A.)	..	Rs. 3,180 (including allowances)
Total	...	<u>Rs. 3,680 (including allowances)</u>

Recommendations of the Committee of the Board

Recommendations of the Board

It was also recommended that the investigator be requested to follow the programme of work suggested by the Research Committee.

The Board endorsed the recommendations of its Committee.

The Board endorsed the recommendations of its Committee.

Item No.	Particulars
81.7	Antifungal antibiotics produced by bacteria by Dr. S. R. Bose, Calcutta. Grant asked for : Equipment : Nil Contingencies : Rs. 1,000 Staff : Rs. 3,370 Total : 4,370 (including allowances) The Committee noted that satisfactory progress had been made and recommended the renewal of the scheme for the year 1955-56 with the following grant : Equipment

Recommendations of the Committee of the Board	Recommendations of the Board								
81. 7 p. 311 The Committee recommended continuance of the research scheme on 'Antifungal antibiotics' by Dr. S. K. Bose with the following grant for 1955-56. <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. 3,370 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 4,370 " "</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 3,370 including allowances	Total	Rs. 4,370 " "	81. 7 p. 311 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff	Rs. 3,370 including allowances								
Total	Rs. 4,370 " "								
81. 8 p. 311 The Committee recommended the continuance of the research scheme on 'Synthesis of peptides' by Dr. B.C. Guha with the following grant: <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,500</td></tr> <tr> <td>Staff</td><td>Rs. 5,380 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 6,880 " "</td></tr> </table> The Committee did not recommend the appointment of an additional Senior Laboratory Assistant. It was also recommended that the investigator be requested to follow the programme suggested by the Research Committee.	Equipment	Nil	Contingencies	Rs. 1,500	Staff	Rs. 5,380 including allowances	Total	Rs. 6,880 " "	81. 8 p. 311 The Board endorsed the recommendations of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,500								
Staff	Rs. 5,380 including allowances								
Total	Rs. 6,880 " "								

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Item No.	Particulars
	Equipment ... Nil Contingencies ... Rs. 1,500 Staff : (One J. R. A.) ... Rs. 3,250 (including allowances) Total ... Rs. 4,750 (including allowances)
81.10	Mode of action of the tetracycline antibiotics in micro-organisms and animals by Dr. A. Sreenivasan, Bombay. Grant asked for : Equipment : Nil Contingencies : Rs. 2,000 Staff : Rs. 6,068 Total : Rs. 8,068 (including allowances) In view of the satisfactory progress of work, the Committee recommended the renewal of the scheme with the following grant : Equipment ... Nil Contingencies ... Rs. 2,000 Staff : (One S. R. A. and one J. L. A.) Rs. 6,068 (including allowances) Total ... Rs. 8,068 (including allowances)
81.11	To evaluate the nutritive value of some lesser known vegetable foodstuffs by Dr. R. G. Chitre, Bombay. Grant asked for : Equipment : Nil Contingencies : Rs. 500 Staff : Rs. 2,296 Total : Rs. 2,796 (including allowances) The Committee felt that work similar to that proposed by the investigator for the next year is already in progress at other centres of research and therefore did not recommend the scheme for renewal.
81.12	Production of itaconic acid by fermentation by Dr. S. Husain Zaheer, Hyderabad (Dn). Grant asked for : Equipment : Rs. 900 Contingencies : Rs. 1,000 Staff : Rs. 5,654 Total : Rs. 7,554 (including allowances)

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Recommendations of the Committee of the Board	Recommendations of the Board
81. 9 p. 311-313 The Committee recommended the following grant for continuance of the research scheme on 'Vitamin A' by Dr. Cama:— Equipment Nil Contingencies Rs. 1,000 Staff Rs. 3,250 including allowances Total Rs. 4,250 " "	81. 9 p. 311-313 The Board endorsed the recommendation its Committee.
81. 10 p. 313 The Committee recommended the continuance of the research scheme on 'Tetracycline antibiotics' by Dr. A. Sreenivasan with the following grant: Equipment Rs. 1,000 Contingencies Rs. 1,000 Staff Rs. 4,469 including allowances Total Rs. 6,469 " " The Committee did not recommend the additional post of Junior Laboratory Assistant.	81. 10 p. 313 The Board endorsed the recommendations its Committee.
81. 11 p. 313 The Committee noted that the scheme had since been terminated.	81. 11 p. 313 The Board noted.

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Item No.	Particulars
	As the scheme had been commenced only late in the current year, the Committee recommended the scheme for renewal with the following grant :
	Equipment ... Nil
	Contingencies ... Rs. 1,000
	Staff : (One S.R.A., one J.L.A.) ... Rs. 5,654 (including allowances)
	Total Rs. 6,654 (including allowances)
81.13	Chemistry of plant chromosomes by Mr. A. K. Sarma, Calcutta.
	Grant asked for : Equipment : Rs. 3,500 Contingencies : Rs. 1,500 Staff : Rs. 3,928 Total : Rs. 8,928 (including allowances)
	The Committee recommended the renewal of the scheme and approved of the author's programme as given, with the remarks that special emphasis should be given to finding out a suitable solvent for chromatographic studies on nucleic acid and protein constituents. The following grant was recommended :
	Equipment ... Nil
	Contingencies ... Rs. 1,500
	Staff : (One J.R.A.) ... Rs. 3,928 (including allowances)
	Total Rs. 5,428 (including allowances)
81.14	Studies on carbohydrate metabolism by Prof. M. C. Nath, Nagpur.
	Grant asked for : Equipment : Rs. 500 Contingencies : Rs. 2,440 Staff : Rs. 8,164 Total Rs. 11,104 (including allowances)
	The Committee noted that the work had been started only from 1-11-54 and recommended the renewal of the scheme with the following grant :
	Equipment ... Nil
	Contingencies ... Rs. 1,500
	Staff : (One S.R.A.) ... Rs. 4,154 (including allowances)
	Total Rs. 5,654 (including allowances)

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Recommendations of the Committee of the Board	Recommendations of the Board
81. 12 p. 313-315 The Committee recommended renewal of the research scheme on 'Itacnoic acid' by Dr. S.H. Zaheer with the following grant. Equipment Nil Contingencies Rs. 1,000 Staff Rs. 5,015 including allowances Total Rs. 6,015 " "	81. 12 p. 313-315 The Board endorsed the recommendation of its Committee.
81. 13 p. 315 The Committee recommended the renewal of the research scheme on 'Plant chromosomes' by Mr. A.K. Sharma with the following grant for 1955-56. Equipment Nil Contingencies Rs. 1,000 Staff Rs. 3,645 including allowances Total Rs. 4,645 " "	81. 13 p. 315 The Board endorsed the recommendation of its Committee.
81. 14 p. 315 The Committee recommended the following grant for continuance of the research scheme on 'Carbohydrate metabolism' by prof. M.C. Nath during 1955-56. Equipment Nil Contingencies Rs. 1,500 Staff Rs. 4,262 including allowances Total Rs. 5,762 " "	81. 14 p. 315 The Board endorsed the recommendation of its Committee.

Item No.	Particulars								
81.15	Determination of processing conditions for the preservation of Indian vegetables by heat treatment (canning) by Dr. A. N. Bose, Calcutta.								
	The Committee noted that the scheme is to be terminated on 31-3-1955 and requested the investigator to write up the final report for further necessary action.								
82	Subject : Vegetable oils research schemes (renewals) Note : 82.0 The Vegetable Oils Research Committee in its meeting held on the 12th Jan. 1955 at Delhi considered applications for renewals of schemes and recommended the following : 82.1 A chromatographic study of fats and fatty acids by Dr. D. Rebello, Bombay. <table> <tr> <td>Grant asked for : Equipment : Nil</td> <td>Contingencies : Rs. 1,000</td> </tr> <tr> <td>Staff : Rs. 3,170</td> <td>Total : Rs. 4,170 (including allowances)</td> </tr> </table> It was felt that the scheme and the programme were not clear. It was agreed that Dr. Rebello be requested to send a more precise report of the work already done and the future programme of work. The Committee recommended the scheme for continuance. 82.2 Stability of the component fatty acids of hydrogenated fats by Dr. N. G. Magar, Bombay. <table> <tr> <td>Grant asked for : Equipment : Nil</td> <td>Contingencies : Rs. 600</td> </tr> <tr> <td>Staff : Rs. 3,120</td> <td>Total : Rs. 3,720 (including allowances)</td> </tr> </table> The Committee was of the opinion that the fractionation of hydrogenated fats using low temperature crystallisation technique does not seem to serve any purpose. More attention should be given to the stability of the total fat. The scheme was recommended for continuance for six months by which time the work may be brought to completion and a full report submitted.	Grant asked for : Equipment : Nil	Contingencies : Rs. 1,000	Staff : Rs. 3,170	Total : Rs. 4,170 (including allowances)	Grant asked for : Equipment : Nil	Contingencies : Rs. 600	Staff : Rs. 3,120	Total : Rs. 3,720 (including allowances)
Grant asked for : Equipment : Nil	Contingencies : Rs. 1,000								
Staff : Rs. 3,170	Total : Rs. 4,170 (including allowances)								
Grant asked for : Equipment : Nil	Contingencies : Rs. 600								
Staff : Rs. 3,120	Total : Rs. 3,720 (including allowances)								

Recommendations of the Committee of the Board	Recommendations of the Board								
81. 15 p. 317 The Committee noted that the scheme had since been terminated and recommended that Dr. Bose be requested to submit the final report.	81. 15 p. 317 The Board noted and endorsed the recommendation of its Committee.								
82. 0 p. 317 The Committee noted. 82. 1 p. 317 The Committee recommended continuance of the research scheme on 'Chromatographic study of fats' by Dr. Rebello with the following grant: <table border="0"> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff</td><td>Rs. 3,170 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 4,170 " "</td></tr> </table> The Committee endorsed the recommendation of the Research Committee that Dr. Rebello be requested to send a precise report of the work done and the future programme of work.	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 3,170 including allowances	Total	Rs. 4,170 " "	82. 0 p. 317 The Board noted.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff	Rs. 3,170 including allowances								
Total	Rs. 4,170 " "								
82. 2 p. 317 The Committee recommended the continuance of the research scheme on 'Stability of component fatty acids' by Dr. Magar for six months only with the following grant : <table border="0"> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 300</td></tr> <tr> <td>Staff</td><td>Rs. 1,530 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 1,830 " "</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 300	Staff	Rs. 1,530 including allowances	Total	Rs. 1,830 " "	82. 1 p. 317 The Board endorsed the recommendations of its Committee. 82. 2 p. 317 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 300								
Staff	Rs. 1,530 including allowances								
Total	Rs. 1,830 " "								

Item No.	Particulars
83	Subject : Essential oils research schemes (renewals) <i>Note :</i> 83.0 The Essential Oils Research Committee in its meeting held on January 8, 1955 considered the reports of the schemes in progress and made recommendations for their continuance. 83.1 Rose scheme by Dr. D. R. Dhingra and Prof. K. N. Kaul, Kanpur. Grant asked for : Equipment : Rs. 4,000 Contingencies : Rs. 4,500 Staff : Rs. 1,470 Total : Rs. 9,970 (including allowances) Two varieties of rose, Rosa damascena and Rose Edward, were under experimental cultivation and flowers of both varieties were being extracted by both solvent extraction and distillation methods. A report of the work so far done was circulated. 83.2 Cultural experiments on patchouli by Dr. D. K. Banerjee, Bangalore. Grant asked for : Equipment : Rs. 480 Contingencies : Rs. 1,700 Staff : Rs. 9,532 Total : Rs. 11,712 (including allowances) The Chairman had visited the patchouli gardens and was satisfied with the progress made. The report of Dr. D. K. Banerjee had already been circulated. With regard to the supply of rooted cuttings for propagation, Mr. Nirody had stated that the proper time was April–May, but according to Dr. Dhingra and Prof. Kaul the most suitable time for planting in North India was February–March. Dr. Dhingra and Prof. Kaul each wanted 50 rooted cuttings of the plant. These will be supplied. The members agreed to the extension of the scheme till March 1956, during which period all the data should be collected and plants made available for cultivation in suitable localities throughout India. Dr. Bhattacharyya and Mr. Nirody should be requested to write a bulletin giving full instructions for planting, manuring etc., with details of equipment required for the distillation of oil as this will prove useful to prospective cultivators and distillers.

Recommendations of the Committee of the Board	Recommendations of the Board
83. 0 p. 319 The Committee noted. 83. 1 p. 319 The Committee recommended the following grant for continuance of the research scheme on Rose by Dr. Dhingra and Prof. Kaul : Equipment Rs. 4,000 Contingencies Rs. 2,500 Staff Rs. 2,972 including allowances Total Rs 9, 472 " "	83. 0 p. 319 The Board noted. 83. 1 p. 319 The Board endorsed the recommendation of its Committee.

Item No.	Particulars
	The Committee was of the view that the existing plantation should ultimately serve as a nursery for the supply of patchouli cuttings for propagation throughout the country. 83.3 Research on medicinal and essential oils plants by the Director, Cinchona Dept., Ootacamund. Cultivation of Canada odorata :- It was recommended that this plant may be taken up in the scheme assigned to the Director, Cinchona Department, Ootacamund. 83.4 Cultural and chemical investigation on vetiver roots by Dr. D.R. Dhingra, Kanpur. Dr. Dhingra brought to the notice of the Committee that the land where vetiver roots are under cultivation has to be irrigated during the summer months beginning from the end of March, for which a pumping set was necessary. There is a well which can supply the required quantity of water. The members were of the opinion that a sum of Rs. 2,000/- estimated for purchasing the pump, etc., should be provided as a block grant. The Committee recommended sanction.
84	Subject : Plastics research schemes (renewals) Note : 84.0 The Plastics Research Committee in their meeting held on January 28, 1955 considered the renewal applications in respect of the following schemes in progress and recommended their continuance during 1955-56. 84.1 Polymerisation of carenes (delta 3-carenes) from Indian turpentine oil of Pinus longifolia by Dr. L. M. Yeddnapalli Grant asked for : Equipment : Nil Staff : Rs. 3,705 Contingencies : Rs. 1,000 Total Rs. 4,705 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board								
83. 2 p. 319-321 The Committee noted with satisfaction the successful introduction and propagation of Malayan patchouli in India. The Committee recommended the following grant for continuance of the research scheme during 1955-56. <table> <tr> <td>Equipment</td><td>Rs. 480</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,500</td></tr> <tr> <td>Staff</td><td>Rs. 9,527 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 11,507 " "</td></tr> </table>	Equipment	Rs. 480	Contingencies	Rs. 1,500	Staff	Rs. 9,527 including allowances	Total	Rs. 11,507 " "	83. 2 p. 319-321 The Board noted and endorsed the recommendation of its Committee.
Equipment	Rs. 480								
Contingencies	Rs. 1,500								
Staff	Rs. 9,527 including allowances								
Total	Rs. 11,507 " "								
83. 3 & 83. 4 p. 321 The Committee recommended the continuance of the research scheme with grants specified against each : 83. 3 Essential oil plants—Cinchona Dept., Ootacamund. <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 2,000</td></tr> <tr> <td>Staff</td><td>Rs. 2,420 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 4,420 " "</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 2,000	Staff	Rs. 2,420 including allowances	Total	Rs. 4,420 " "	83. 3 p. 321 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 2,000								
Staff	Rs. 2,420 including allowances								
Total	Rs. 4,420 " "								
83. 4 Vetiver roots by Dr. Dhingra. <table> <tr> <td>Block Grant</td><td>Rs. 2,000</td></tr> <tr> <td>Total</td><td>Rs. 2,000</td></tr> </table>	Block Grant	Rs. 2,000	Total	Rs. 2,000	83. 4 p. 321 The Board endorsed the recommendation of its Committee.				
Block Grant	Rs. 2,000								
Total	Rs. 2,000								
84. 0 p. 321 The Committee noted.	84. 0 p. 321 The Board noted.								
84. 1 p. 321 The Committee recommended the continuance of the research scheme on 'Polymerisation of carenes' by Dr. L. M. Yeddnapalli during 1955-56 along with the following grant : <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. 2,435 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 3,435 " "</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 2,435 including allowances	Total	Rs. 3,435 " "	84. 1 p. 321 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff	Rs. 2,435 including allowances								
Total	Rs. 3,435 " "								

Item No.	Particulars
84.2	Construction of light scattering apparatus for the measurement of molecular weight, size and shape of high polymers by Dr. Santi R. Palit. Grant asked for : Equipment : Rs. 500 Contingencies : Rs. 500 Staff Rs. 6,698 Total Rs. 7,698 (including allowances)
84.3	Studies on thermodynamic properties of high polymer solutions by Dr. Santi R. Palit: Grant asked for : Equipment : Rs. 1,000 Contingencies : Rs. 1000 Staff : Rs. 3,918 Total Rs. 5,918 (including allowances) The Committee recommended that the post of one additional Junior Research Assistant be sanctioned so as to expedite the work.
85	Subject : Leather research schemes (renewals) Note : 85.0 The Leather Research Committee at its meeting held on January 7, 1955 reviewed the progress of work and recommended the following schemes for renewal : 85.1 Study of the characteristic behaviours of the Sundarban Mangroves, specially Goran (<i>Ceriops roxburghiana</i>) by Mr. M. Banerjee, Calcutta. Grant asked for : Equipment : Nil Contingencies : Rs. 500 Staff : Rs. 4,445 Total : Rs. 4,945 (including allowances) The future programme of work was approved. 85.2 Manufacture of upholstery leather and other special types of leathers such as picker saver (buffer) leather and orthopoedic leather by Mr. M. Banerjee, Calcutta. Grant asked for : Equipment : Nil Contingencies : Rs. 1000 Staff : Rs. 3,380 Total : Rs. 4,380 (including allowances)

Recommendations of the Committee of the Board	Recommendations of the Board
84. 2 & 84. 3 p. 323 The Committee recommended the continuance of the research schemes with the grants indicated against each : 84. 2 Construction of light scattering apparatus— Dr. S. R. Palit. Equipment Rs. 500 Contingencies Rs. 500 Staff Rs. 5,708 including allowances Total Rs. 6,708 " " 84. 3 p. 323 Thermodynamic properties of high polymer solutions—Dr. S. R. Palit. Equipment Nil Contingencies Rs. 1,000 Staff (1 SRA & 1 JRA) Rs. 7,389 including allowances Total Rs. 8,389 " "	84. 2 p. 323 The Board endorsed the recommendation of its Committee. 84. 3 p. 323 The Board endorsed the recommendation of its Committee.
85. 0 p. 323 The Committee noted.	85. 0 p. 323 The Board noted.
85. 1 p. 323 The Committee recommended continuance of the research scheme on 'Sundarban Mangroves' by Mr. Banerjee during 1955-56 with the following grant : Equipment Nil Contingencies Rs. 500 Staff Rs. 4,444 including allowances Total Rs. 4,944 " "	85. 1 p. 323 The Board endorsed the recommendation of its Committee.

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RENEWALS

Item No.	Particulars				
	by two or three processes. The sulphate process seemed to be efficient and economical. It was however necessary to work out the full set of conditions for which trials at a large paper making plant were required. The Committee recommended that the scheme be renewed with a grant of Rs. 11,054 with the proviso that the scheme would be wound up by March 31, 1956 and a consolidated report of the work done so far, prepared. The Committee also requested the C. S. I. R. to approach the National Research Development Corporation to arrange for facilities for Dr. Bhat for large scale experiments in a suitable paper mill so that full efficiency of the raw materials utilized and the processes adopted in the manufacture of newsprint from bamboo may be assessed.				
87	Subject : Building research scheme (renewal) <i>Note :</i> 87.0 The Building Research Committee at its meeting held on January 5, 1955 recommended the following scheme for renewal. 87.1 Studies in the utilization of blast furnace cement in cement making by Dr. D. Lahiri, Calcutta. <table> <tr> <td>Grant asked for : Equipment : Nil</td><td>Contingencies : Rs. 2,000</td></tr> <tr> <td>Staff : Rs. 4,430</td><td>Total Rs. 6,430 (including allowances)</td></tr> </table> The Committee noted that the work was initiated only very recently. The Committee recommended that Dr. Lahiri be requested to intimate the progress achieved to date, as well as his future programme. The Committee recommended the extension of the scheme for a further period of six months upto September, 1955 for the present.	Grant asked for : Equipment : Nil	Contingencies : Rs. 2,000	Staff : Rs. 4,430	Total Rs. 6,430 (including allowances)
Grant asked for : Equipment : Nil	Contingencies : Rs. 2,000				
Staff : Rs. 4,430	Total Rs. 6,430 (including allowances)				
88	Subject : Indian Ephemeris and Nautical Almanac by Prof. M. N. Saha, Institute of Nuclear Physics, Calcutta. <i>Note :</i> The scheme was sanctioned by the Council in September, 1954 and the actual				

Recommendations of the Committee of the Board	Recommendations of the Board								
86. 1 p. 325-327 The Committee recommended the continuance of the research scheme on 'Anatomical study of some cellulosic raw materials' by Dr. K.A. Chowdhry and Dr. R.V. Bhatt for one year only with the following grant: <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 1,500</td></tr> <tr> <td>Staff</td><td>Rs. 9,554 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 11,054 " "</td></tr> </table> The Committee recommended that the National Research Development Corporation be requested to arrange for large scale trials of the process developed under the scheme for newsprint.	Equipment	Nil	Contingencies	Rs. 1,500	Staff	Rs. 9,554 including allowances	Total	Rs. 11,054 " "	86.1 p. 325-327 The Board endorsed the recommendations of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,500								
Staff	Rs. 9,554 including allowances								
Total	Rs. 11,054 " "								
87. 0 p. 327 The Committee noted.	87.0 p. 327 The Board noted.								
87. 1 p. 327 The Committee recommended the continuance of the research scheme on 'Utilisation of blast furnace slag' by Dr. D. Lahiri for 6 months only and recommended the following grant: <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. 1,785 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 2,785 " "</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 1,785 including allowances	Total	Rs. 2,785 " "	87. 1 p. 327 The Board endorsed the recommendation of its Committee.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff	Rs. 1,785 including allowances								
Total	Rs. 2,785 " "								

Item No.	Particulars
	work was commenced from November, 1954. The first publication will relate to the year 1957 and will be published by about March, 1956.
	For the purpose of giving proper guidance to the work, Prof. M. N. Saha has suggested that there should be an Advisory Committee termed 'Ephemeris Committee' composed of the following personnel besides himself :
	(1) Director-General of Observatories ;
	(2) Director, Kodaikanal Observatory ;
	(3) Director, Nizamiah Observatory ;
	(4) Representative of the Defence Science Organisation ;
	(5) Representative of the Indian Navy ,
	(6) Representative of the Civil Aviation ;
	(7)-(8) Two distinguished non-official scientists having knowledge of astronomy.
	The following grant has been asked for the year 1955-56 :
	Equipment : ... Rs. 6,500
	[1 Facit (electric) calculating machine, 1 typewriter (big size), and furniture].
	Contingencies ... Rs. 3,000
	Staff : ... Rs. 34,500 (including allowances)
	(2 S. S. Os (in lieu of 2 SSAs) ;
	4 J RAs (in addition to existing two) ;
	3 Upper Division Clerks (in addition to existing one) ;
	2 lower Division Clerks (as existing now).
	1 Peon (as existing now).
	Total : Rs. 44,000 (including allowances)
	(Items received late are included in the Supplementary Agenda)

Recommendations of the Committee of the Board	Recommendations of the Board								
88 p. 327-329 The Committee noted that Prof. M.N. Saha has since requested that the work of compilation and publication of Indian Ephemeris and Nautical Almanac should become a permanent activity under the Government of India and be attached to the India Meteorological Department. The Committee recommended that the Government of India be requested to take over this work under the India Meteorological Department. The Committee also recommended the following grant for a period of six months only to enable Prof. Saha to continue the present staff under him, who are engaged in the work of translating the Marathi book on Bharatiya Jyotish Shastra and printing of the National Experimental Calender: <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. 12,036 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 13,036 " "</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 1,000	Staff	Rs. 12,036 including allowances	Total	Rs. 13,036 " "	88 p. 327-329 The Board endorsed the recommendations of its Committee and further suggested that the India Meteorological Department be requested to have the Ephemeris work done by their permanent staff supervised by an Advisory Committee.
Equipment	Nil								
Contingencies	Rs. 1,000								
Staff	Rs. 12,036 including allowances								
Total	Rs. 13,036 " "								

**SUPPLEMENTARY PROCEEDINGS
OF THE 34th MEETING OF THE
BOARD OF SCIENTIFIC & INDUSTRIAL RESEARCH
MARCH 21, 1955**

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SUPPLEMENTARY AGENDA—MINING RESEARCH STATION

Item No.	Particulars
89	<i>Subject : Mining Research Station</i> <i>Note :</i> 89.0 A plan for the establishment of a Mining Research Station was approved by the Governing Body of the C. S. I. R. at its meeting held in August, 1952 and the proposal was referred to the Ministry of Finance and the Ministry of Production for provision of necessary funds. The Ministry of Production under whom the Coal Board functions, pointed out that certain aspects of mining research, such as, stowing in mines was the function of the Coal Board delegated to it under the Coal Mines (Conservation and Safety) Act and work was actually under way. A separate Committee was also set up under the Coal Board for the establishment of a Mining Research Station under the auspices of the Coal Board. When the proposal came up for discussion before the Planning Commission, the Ministry of Production raised this issue. The Planning Commission desired at that meeting that the Ministry of Production and the C. S. I. R. should arrive at a formula regarding the Mining Research Station and put forward an agreed proposal. An Inter-Ministerial meeting was held in July, 1954 and it was finally agreed that : (i) the Mining Research Station will function under the CSIR (Ministry of NR & SR); (ii) the Coal Board will make such contributions to the Mining Research Station as it considered appropriate and feasible; (iii) the Coal Board will be free to undertake such research on practical aspects of coal mining as it thought best; and (iv) an Advisory Board for the proposed Mining Research Station will be constituted consisting of 5 nominees from the Coal Board on behalf of the Ministry of Production and 5 nominees from the CSIR on behalf of the Ministry of NR & S.R (50:50). (v) the Chairman of the Coal Board will be one of the representatives of the Coal Board and will be the Chairman of the Advisory Board.

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars
	The Mining Research Committee was accordingly reconstituted and Dr. J. W. Whitaker, Officer on Special Duty, F. R. I. was appointed Secretary to the Committee and entrusted with the work on planning of the Mining Research Station. The agreed proposals were forwarded to the planning Commission and they have accepted the proposal in principle and have called for the final plan and the estimates. Dr. Whitaker who was on leave to U. K. from Oct.-Dec., 1954 was requested by the Council to visit the Safety in Mines Research Stations in U. K., France, Holland and Belgium to enable him to prepare an up-to-date plan for the Mining Research Station for India. The revised plan prepared by Dr. Whitaker on the basis on his recent experience was placed before the reconstituted Mining Research Committee. PROCEEDINGS OF THE MINING RESEARCH COMMITTEE 89.1.0 A meeting of the reconstituted Mining Research Committee was held on February 26, 1955 at Dhanbad for finalising the site, plan and programme of work for the Mining Research Station. 89.1.1 Site : The Committee visited the two potential sites and examined the contoured plans of each. They were in favour of the "vehicle disposals site" of about 150 acres. They favoured this site because (i) it was not cut into by any cultivated land; (ii) it was near the School of Mines and the Mines Department; (iii) it would provide residential quarters very near Dhanbad; (iv) the purchase value would be low; (v) it was more easily accessible to electric power supply; (vi) it was probable that ample water would be available; (vii) the hill at the north of the site would afford suitable ground for tests on explosions and explosives and might be used for a water tower; (viii) it would be easy to procure the site without delay. The Committee resolved that subject to the approval of the Architects, this site should be chosen. 89.1.2 Scope of Work : The Chairman referred briefly to the general magnitude of the estimates and pointed out the limited funds at the disposal of the Coal Board. The Coal Board had

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars
	not made any commitment except that it would make "such contributions as it considered appropriate and feasible". In the matter of health research he considered that enquiries should be made regarding co-operation with the Health Ministry and the Miners Welfare Organisation. The Committee concurred, and requested the C. S. I. R. to approach the Health Ministry to ascertain how co-operation might best be effected and to avoid duplication of work. Dr. Whitaker was also asked to approach the Miners' Welfare Organisation on this matter and explore whether any financial aid might be forthcoming. The representative from the CSIR read a note from the Ministry of Production on provision of funds for the establishment of a Mining Research Station. In this note it was suggested that "if there is no objection, Dr. Whitaker's proposals may be placed before the Governing Body for consideration and approval, and also for suggesting the allocation of expenditure between the C. S. I. R. and Coal Board." The Chairman in reply considered that the Coal Board should be approached direct regarding this allocation of expenditure. In the present state of the finance he felt that unless they had a considerable finance, they would no doubt be considered in the light of the other commitments and suitable action taken. The Committee approved the scope of the programme outlined. 89.1.3 Draft proposals and estimates : The Committee had had the draft proposals and estimates before them for some days before the meeting. In general the proposals were approved but it was pointed out that care should be taken to avoid overlapping in equipping the library with books and literature readily available in the F. R. I. or the Indian School of Mines and Applied Geology. The Chairman also suggested that the size of the office rooms should be in keeping with the Government standards as far as possible, the laboratory rooms of course would be according to the C. S. I. R. standards and requirements. It was recommended by Sri A. B. Guha that the "small workshops" attached to some divisions should be termed Repair Rooms to avoid confusion with the Main Workshop.

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SUPPLEMENTARY AGENDA—MINING RESEARCH STATION

Item No.	Particulars			
	The Committee approved of the following as provisional estimates for capital and recurring expenditure :			
	<i>Capital</i>			
	Year	Buildings	Services (Rs. in lakhs)	Equipment Total
	1955-56	4.0	3.0	1.0
	1956-57	12.0	3.0	8.0
	1957-58	3.0	1.0	5.0
		<u>19.0</u>	<u>7.0</u>	<u>14.0</u> <u>40.0</u>
	<i>Recurring</i>			
	Year	Staff	Contingencies	Total
	1955-56	1.0	1.0	2.0
	1956-57	2.5	2.5	5.0
	1957-58	4.0	4.0	8.0
	1958-59	5.0	5.0	10.0
89.1.4 Sub Committees : Local Planning Committee				
The Committee felt that the immediate need was for the establishment of the Local Planning Committee. The remaining Committees should be constituted later. The following were nominated as members of the Local Planning Committee ;				
1. Nominee of the Coal Board 2. The Chief Inspector of Mines or his nominee. 3. The Principal of the Indian School of Mines or his nominee. 4. The Director, Fuel Research Institute. 5. Mr. Rosser (Andrew Yule & Co.) 6. Mr. S. C. Ghose (Coal Superintendent, TISCO.) 7. The Additional Deputy Commissioner, Dhanbad. 8. Planning Officer (Secretary).				
89.1.5 Appointment of Architects :				
It was recommended that the appointment of architects be left to the C. S. I. R.				

Recommendations of the Committee of the Board

Recommendations of the Board

SUPPLEMENTARY AGENDA—MINING RESEARCH STATION

Item No.	Particulars
	The Committee in the first instance, however, would like the opinion of the Council's architects on the suitability of the site selected. 89.2 PLAN FOR THE MINING RESEARCH STATION PROGRAMME OF WORK In different countries the mining problems encountered have different degrees of importance. In India there is no need to follow the schemes developed in other countries, nor to give them here the same relative attention. It is preferable first to analyse the chief problems arising in Indian mines, and then to undertake and direct the researches accordingly, in the light of probable developments. The experience of other countries will of course be borne in mind, referred to and used when dealing with similar problems here. In India there would seem to be need for the following divisions :— DIVISIONS <i>Explosions, Fires And Ventilation :</i> (i) Mine ventilation; fire-damp, drainage and atmospheres; humidity; strata and mine temperatures. (ii) Spontaneous combustion and prevention of mine fires; fire hazards, and the detection of incipient heating. (iii) Mine-lighting : portable, fixed, and special. (iv) Explosives and explosions, with special reference to safety and dust suppression. (v) Mine rescue apparatus. (vi) Testing of mine air, mine dusts, etc., and general analysis. <i>Mine Working :</i> (i) Strength of rock pillars, size of pillars, roof supports and subsidence, behaviour of strata, rock drilling, roof pressures, and roof bolting; methods of work. (ii) Stowing (cooperation with the existing Field Research Unit of Coal Board); hydromechanics researches.

Recommendations of the Committee of the Board	Recommendations of the Board

SUPPLEMENTARY AGENDA—MINING RESEARCH STATION

Item No.	Particulars
	(iii) Problems of mine mechanisation. (iv) Underground gasification of coal. <i>Engineering and Testing :</i> (i) Haulage and winding problems with special reference to winding ropes, haulage ropes, balance ropes, rope cappings and couplings; diesel and other locomotives. (ii) Testing of broken and defective gear, ropes, flame-proof enclosures, lamps, signalling devices and intrinsically safe apparatus. (iii) Workshops (vi) Stores <i>Health :</i> (i) Dust problems: silicosis and pneumoconiosis including dust sampling and dust equipment testing, i. e., testing of rock drill dusts, dust masks and dust traps. (ii) Other health problems, e. g., nystagmus, ankylostomiasis, etc. A medical section equipped with X-ray apparatus, ergometers, electrocardiographs etc. is essential. <i>Administration :</i> (i) Library, information and intelligence. (ii) Finance and establishment. The layout will thus fall naturally into the 5 divisions : 1. Administration and Intelligence. 2. Explosions and Fires. 3. Mine Working and Support of Strata. 4. Engineering and Testing. 5. Health. LAYOUT AND COST The requirements and layout of each division are given below :— <i>Administration :</i> This will necessitate a fairly extensive layout, as allowance will have to be

Recommendations of the Committee of the Board	Recommendations of the Board

SUPPLEMENTARY AGENDA—MINING RESEARCH STATION

Item No.	Particulars
	made for :—
	(a) Administrative offices, including finance, stenós and rooms for Director and Chief Officers.
	(b) Library and information.
	(c) Publications, including photogoraphy section, photostat apparatus etc.
	(d) Lecture hall and committee room—lantern and cine projector
	(e) Canteen and common room for staff.
	The building should be easily accessible to the public.
	Estimated building cost ... 3 lakhs.
	Air conditioning ... 1.5 lakhs
	Explosions and Fires :
	The requirements are :
	(a) 1 room for Officer-in-Charge— 20' x 15'
	(b) 3 rooms for chemical laboratories for gas, dust, rocks, etc. 25' x 30'
	Chemical stores—1 room 25' x 25'
	(c) 3 rooms for physical laborator— ies for lighting, electrcity, etc. 25' x 30'
	Physical stores—1 room 25' x 25'
	(d) One large work room (100' x 30') for ventilation studies and other experiments on large scale.
	(e) Separate section for the testing of explosives, ballistic pendulum, boiler shell and cannon, lead blocks, etc., and explosives magazine.
	(f) A supply of methane and coal (dust) to (e) and dust grinders.
	Building costs ... Rs. 3 lakhs.
	Air conditioning ... Rs. 1 lakh.
	Mine Working (including Geology) :
	(a ₁) Room for Officer-in-Charge ... 20' x 15'
	(a ₂) Laboratory ... 25' x 30'
	(b) Small workshop ... 25' x 30'

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SUPPLEMENTARY AGENDA—MINING RESEARCH STATION

Item No.	Particulars	
	(c) Long workroom for work on rocks, drilling, etc.	100' × 30'
	(d) Long workroom for hydromechanics and mine mechanisation	... 100' × 30'
	Building cost	Rs. 2 lakhs
	Air conditioning	Rs. 0.5 lakh
	<i>Engineering and Testing :</i>	
	(a ₁) Room for Officer-in Charge	... 20' × 15'
	(a ₂) Room for testing strength of materials, diesel engines, etc.	... 100' × 30'
	(b) Rooms 20' × 30' and rooms 10' × 10' (at a safe distance or sunk) for testing flame-proof apparatus (with supply of methane).	...
	(c) Drawing office	... 30' × 25'
	Records office	... 30' × 25'
	(d) Workshop	... 100' × 30'
	(e) Stores	... 100' × 30'
	(f) Engineering Laboratory	... 25' × 30'
	Building cost	Rs. 3 lakhs
	Air conditioning	Rs. 1 lakh
	<i>Health : (Cooperation with Coal Mines Welfare Department essential).</i>	
	Room for Officer-in-Charge	... 20' × 15'
	Chemical laboratory	... 25' × 30'
	Biological laboratory	... 25' × 30'
	Physics laboratory	... 25' × 30'
	Medical rooms (2)	... 25' × 30'
	X-ray room.	... 25' × 30'
	Ergometer and treadmill	... 25' × 30'
	Records.	... 25' × 30'
	Special apparatus room	... 25' × 30'

Recommendations of the Committee of the Board	Recommendations of the Board

SUPPLEMENTARY AGENDA—MINING RESEARCH STATION

Item No.	Particulars	
	Building cost	Rs. 2 lakhs
	Air conditioning	Rs. 1 lakh
	<i>Summarising :</i>	
	Building cost	Rs. 13 lakhs.
	and Air Conditioning	Rs. 5 lakhs.
	<i>Miscellaneous finance :</i>	
	1. A supply of methane is essential : the methane plant (fermentation may cost with controls, accessories, and pipe line connections about Rs. 1 lakh.	
	2. Some 6 large rooms (each 100' × 30') are required in all by the various sections. These may be built as one "Workshop" block.	
	Building and airconditioning—Total	Rs. 19 lakhs.
	3. Total building costs for the Mining Research Station are likely to be of the order of Rs. 19 lakhs. The equipment will probably cost about Rs. 15 lakhs. With estate purchase, layout, roads, water and electricity, the total capital will probably be in the region of Rs. 40 lakhs. This however, can be spread over a period of 5 years, averaging Rs. 8 lakhs per annum.	
	SITE	
	Considerable attention was given to the choice of site earlier by members of the Coal Board Committee and more recently by the Chairman (Mr. Ramadyani) and others. A large site separate from the F. R. I. was strongly recommended by the above Committee, as extensive accommodation would be required to allow for the buildings and laboratories, the layout, and the provision for dangerous work on explosives and explosions. Ground would also be required for the housing of the staff, numbering probably 200 or 300 eventually. It was also considered that the Mining Research Station should be easily accessible from the Indian School of Mines & Applied Geology and from the headquarters of the Chief Inspector of Mines. Accordingly, several sites were again inspected in the Dhanbad area, and a report on them submitted to the Mining Research Committee.	
	STAFF	
	The total technical and administrative staff for the Station is estimated at 70-80. To this will be added Class IV servants, laboratory assistants and cleaning staff—	

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars
	probably numbering in all about 140 in the ratio of 1:2 as usual. The total employees will thus be about 200.
	Director (Rs. 2000—100—2500). Rs. 3,500
	Administrative Officer (1) §
	& § Rs. 600-1500 Rs. 4,000
	Assistant Directors (4) §
	Senior Sc. Officers (8) Rs. 350-850 Rs. 4,000
	Junior Sc. Officers (12) Rs. 275-590 Rs. 4,800
	Senior Sc. Asstts. (12) Rs. 250-500 Rs. 3,600
	Junior Sc. Asstts. (16) Rs. 160-330 Rs. 3,600
	Foremen, Mechanics,
	Electrician. etc. (5) Rs. 300 Rs. 1,500
	D. A., P. E., etc. ... Rs. 6,000
	Total : Rs. 31,000
	Salary per annum Rs. 31,000 × 12 = 3.72 lakhs.
	Superintendent; (Assistant-in-Charge & Assistants; Stenographers, Third Division Clerks, Typists, Lab. Assistants, Attendants, Khalasis : Sweepers etc). Rs. 1.00 lakhs.
	Miscellaneous—Drivers, Malis, Chowkidars, etc. 30 × 1000 p. a. Rs. 0.30 „
	(Rs. 83/- p. m. average) Total : Rs. 5.0 lakhs (approx).
	Recurring expenditure : (probable)
	Salaries Contingencies*
	1st year (1954-55) Rs. 0.5 lakhs 0.5
	2nd year (1955-56) 1.5 " 1.5
	3rd year (1956-57) 2.5 " 2.5
	4th year (1957-58) 4.0 " 4.0
	5th year (1958-59) 5.0 " 5.0
	Annual recurring expenditure ... Rs. 10 lakhs.
	*"Contingencies" include transport, stores, installation costs of apparatus, repairs electricity and water charges, travelling expenses, stationery, postage & telephone, book and publications. Salaries, and wages normally account for 2/3 of the recurring expenditure, but in the preliminary stages the ratio may be more nearly 1:1.

Item No.	Particulars
90	Staff quarters :
	Budget estimates for the construction of staff quarters :
	Year Rs. in lakhs
	1955-56 5.00
	1956-57 4.00
	1957-58 6.00
	1958-59 4.50

	Subject :- Research and Development in Pharmaceuticals & Drugs
	Note :
	The Pharmaceuticals Enquiry Committee of the Government of India had made a number of recommendations with regard to research and development in the field of drugs and pharmaceuticals. A joint meeting of the Pharmacology Advisory Committee of the Indian Council of Medical Research, the Medicinal Plants Committee of the Indian Council of Agricultural Research and the Pharmaceuticals & Drugs Research Committee of the C. S. I. R., was held on February 7, 1955. Maj. Gen. S. S. Sokhey presided. The Chairman pointed out the need for organizing drug research in the country in such a manner as to make India self sufficient in drugs. Mr. Nabhar, Drug Controller, explained the recommendations of the Pharmaceutical Enquiry Committee to the Committee. He instanced ipecacuanha, the requirements of which were far in excess of the present output, to show the need for scientific investigations. The cultivation of this plant should be improved in order to improve its emetine content. He suggested that more and more Indian drugs should be included in the Indian Pharmacopoeia. Research work should also be undertaken on the evaluation of drugs. Of the drugs imported 50% were antibiotics, 20% sulpha drugs, and 15% vitamins and hormones etc. However, this gave only a picture of the use of drugs in the urban population and quite a considerable extent of drugs was misused. The Chairman suggested that the Committee should formulate concrete proposals for the Second Five Year Plan by laying down specific targets and methods of achievement.

Recommendations of the Committee of the Board	Recommendations of the Board
89 p. 333-353 The Committee noted that the Planning Commission had already approved in principle the establishment of the Mining Research Station under the auspices of the CSIR. The Committee recommended that the revised plan for the Mining Research Station as proposed by the Research Committee including the phased programme of expenditure, the scope and functions, the details of accommodation and staff, be approved and sent to the Planning Commission. The Committee also recommended approval of the proposal to appoint a local Planning Committee at Dhanbad to advise on the day to day work in connection with the establishment of the Research Station. The Committee also recommended that the Ministry of Works, Housing and Supply be also requested to make necessary provision for construction of staff quarters for the Research Station at an early date.	89 p. 333-353 The Board noted and endorsed the recommendations of its Committee.

Item No.	Particulars
	Dr. C. G. Pandit suggested that essential drugs should be defined and then with the help of experts, efforts should be made to find local substitutes. Dr. J. N. Mukherjee suggested the creation of an agency for the purpose of co-ordination of research work. The present efforts should be strengthened and new research units should be built around competent workers. Dr. B. Mukerji suggested the formulation of a detailed plan under the following four main groups :— (i) Medicinal plants. (ii) Biological products. (iii) Synthetic drugs such as antimalarials, sulphones, vitamins, fine chemicals and solvents, etc. (iv) Antibiotics. <i>Medicinal plants :</i> Col. Chopra was of the opinion that information on the actual quantities of medicinal plants grown in different states should be obtained by a central agency. Col. Bhatnagar suggested the use of Forest Utilization Officers in different states for this purpose. Mr. S. P. Sen suggested the creation of a Board to survey the existing medicinal plants, foster the growth of those that were dying or likely to die out from the country and introduce foreign plants in India. The Committee was of the opinion that a separate unit should be created in the Commerce Ministry for this purpose with experts from the Forest Department, Indian Council of Agricultural Research and others. Mr. Budhwar was of the opinion that the Forest Department should be entrusted with the task of collecting the materials as in Kashmir. Of the 2300 medicinal plants in India, he suggested that a small number of 50 may be selected for scientific cultivation during the Second Five Year period. Dr. Hamied suggested that the exporting agencies should also be contacted for information on the availability of medicinal plants. Dr. Pal explained the work under the Indian Council of Agricultural Research on the cultivation of medicinal plants. Col. Chopra suggested the establishment of farms on the model of the Kashmir farm. Formation of a Sub-Committee consisting of the following was recommended to study the problem in all its aspects and make specific recommendations : Dr. M. S. Verma (Convener), Dr. B. Mukerji, Mr. R. L. Budhwar, Dr. B. P. Pal.

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars
	<i>Biological products :</i> The Drug Controller informed that no vaccines and only a few sera were now being imported into the country. Dr. Hamied pointed out the difficulties in the way of production of insulin in India. Members felt that collection of glandular material from slaughter houses should be properly organized. The following Sub-Committee was recommended to go into details of these problems and make specific recommendations : Dr. Chakravarty (Convener), Dr. N. K. Datta, Shri S. P. Sen, Major Dutta. <i>Synthetic drugs, fine chemicals' solvents, etc.</i> Members generally referred to the unsatisfactory position with regard to basic chemicals' solvents, etc. required for the manufacture of synthetic drugs. In the first instance, such subsidiary and basic chemicals as were necessary for the manufacture of specific synthetic drugs in India should be exempted from import duty. A Sub-Committee consisting of the following was recommended to consider the details of the problems and make specific recommendations : Major Gen. Sir Sahib Singh Sokhey (Chairman) & Dr. K. A. Hamied (Convener), Dr. J. N. Mukerji, Shri S. P. Sen. <i>Antibiotics:</i> It was recommended that the Penicillin Committee of the Government of India of which Col. Chopra was Chairman, be requested to consider the subject further and make recommendations. <i>Training :</i> The need for strengthening training facilities in pharmacology was discussed. It was considered that facilities should be provided in all the existing departments of pharmacology in the country for training in this subject. At present medical graduates do not come forward for training as pharmacologists. It was suggested that science graduates could be trained as pharmacologists. A suitable programme could be worked out as follows : A small number of trainees could be assigned, preferably with scholarships, to a department of pharmacology. These trainees could undertake the testing of drugs from industry and also help the department in its teaching and research programme. On the completion of the programme, the trainees could be absorbed in the department itself as regular and permanent members of the staff. This would enable the training of additional pharmacologists.

Recommendations of the Committee of the Board	Recommendations of the Board

Item No.	Particulars												
	Such programme of in-service training would ensure both continuity of work and the employment of those trained. This would require additional finances. It would also be necessary to establish therapeutic trial units in various hospitals to undertake the testing of compounds manufactured in India or imported. This matter was already receiving the attention of the I. C. M. R. A suggestion was also made that in order to attract science graduates to come forward to work as pharmacologists, chemotherapy should also be recognised as a special field of study within the framework of pharmacology for the award of higher degrees by the universities. The Committee also recommended that the Sub-Committee should lay down target figures as to the number of persons to be trained in several categories during the five year period. The Committee which had been constituted by the Pharmaceuticals & Drugs Research Committee of the C. S. I. R. to which the conveners of these sub-Committees may be added, was requested to submit final proposals by the end of February 1955.												
91	<i>Subject : Mineralogical Research</i> <i>Note :</i> 91.0 Geologists working in the various University Departments approach the C. S. I. R. for financial assistance for doing research on mineralogy and other aspects of geology. The Geological Survey of India under whose auspices considerable amount of investigations in these subjects are underway do not provide financial assistance to university departments engaged in geophysical and geochemical investigations which need encouragement in order to develop active schools of research in geological subjects. The following schemes have been received by the Council recently : 91.1.1 Investigation of Rajputana ores and minerals—Prof. K. P. Rode, Prof. of Geology, University of Rajputana, Udaipur. [The object of the scheme is to investigate in detail the occurrence, exact nature, quality, quantity, beneficiation and utilization of minerals such as lead, zinc, tungsten, manganese, copper, etc. of Rajputana. <i>Grant asked for :</i> <table> <tr> <td>Equipment :</td><td>Rs. 50,000</td></tr> <tr> <td>(Quartz Spectrograph)</td><td></td></tr> <tr> <td>Contingencies :</td><td>Rs. 5,000</td></tr> <tr> <td>(Chemicals, photographic materials etc.)</td><td></td></tr> <tr> <td>Staff :</td><td>2 S. R. A s.</td></tr> <tr> <td></td><td>1 J. R. A.]</td></tr> </table>	Equipment :	Rs. 50,000	(Quartz Spectrograph)		Contingencies :	Rs. 5,000	(Chemicals, photographic materials etc.)		Staff :	2 S. R. A s.		1 J. R. A.]
Equipment :	Rs. 50,000												
(Quartz Spectrograph)													
Contingencies :	Rs. 5,000												
(Chemicals, photographic materials etc.)													
Staff :	2 S. R. A s.												
	1 J. R. A.]												

Recommendations of the Committee of the Board	Recommendations of the Board
90 p. 353-359 The Committee agreed in general with the recommendations made by the Joint meeting of the Research Committees of the CSIR, ICMR and ICAR regarding planning and organisation of scientific research in the field of pharmaceuticals and drugs in India. It was also noted that these proposals would also be considered by the Governing Body of ICMR on March 28, 1955. The Committee recommended that the DSIR be authorised to collaborate with the ICMR and ICAR and extend such help as were necessary to the Pharmaceuticals and Drugs Research Committee in preparing a comprehensive plan and programme of research in this important field.	90 p. 353-359 The Board noted and endorsed the recommendation of its Committee.

Item No.	Particulars
91.1.2	To investigate the structure and stratigraphy of the autochthonous zone near Ramnagar and Kaltagodam, Dist. Naini Tal, and study the mode of occurrence and industrial uses of the gypsum deposit, of Dhapila Village, Dist. Naini Tal, and Sabastradhari, Dist. Dehra-Dun;
91.1.3	To investigate the occurrence, genesis and ore reserve of iron deposits of Kherna, Ramgarh and Supi area in Nani Tal Dist. by Dr. I. C. Pande, Head of the Department of Geology, Banaras Hindu University, Banaras.
	[The following grants have been asked for the two schemes for 2 years :
	Equipment Rs. 135
	Contingencies (including T. A.) Rs. 1,050
	Staff : Rs. 2,400
	(1 Assistant on Rs. 100/-p. m. each)
	Total : Rs. 3,585]
91.1.4	Geochemical research by Dr. R. C. Sinha, Lecturer in Geology, Banaras Hindu University, Banaras.
	[Dr. Sinha has planned to conduct the investigation in three parts :
	(i) Spectro-photometric and flame photometric studies of major elements;
	(ii) Spectrographic and geochemical studies;
	(iii) Isotope and radioactive study by X-ray and mass spectrograph.
	For the first two parts Dr. Sinha has asked for an equipment grant of Rs. 26,250/- and for the third part Rs. 150,000/- which will be undertaken after a period of 3 years.
91.2	The matter is placed before the B. S. I. R. for laying down a policy that should be followed by the Council for fostering mineralogical research.

91 p. 359-361
The Committee was of the opinion that development of active schools of research in mineralogy and geological subjects in India was of fundamental importance and should be encouraged.

The Committee noted that there was already a Research Committee under the C. S. I. R. dealing with a restricted field of geological research namely Measurement of Geological Time.

The Committee recommended that this Committee could be suitably reconstituted to deal with mineralogy and other geological subjects as well.

The research schemes may be referred to the reconstituted Committee.

91 p. 359-361

The Board noted and endorsed the recommendation of its Committee.

SUPPLEMENTARY AGENDA—ANTHROPOLOGICAL RESEARCH

Item No.	Particulars								
92	Subject : Anthropological Research Blood group investigation in South India with extension in Orissa and Maharashtra by Dr. (Miss) Irawati Karve, Reader in Anthropology and Sociology, Deccan College Research Institute, Poona. The object of the scheme is to carry out blood group investigation of major castes and tribes of Dravidian area, namely, (i) Andhra speaking area; (ii) Kannada speaking area; (iii) Malayalam speaking area; and (iv) Tamil speaking area. As Dravidian influences and migration have spread to Maharashtra and Orissa also, it is proposed to extend the investigation to these areas at a later stage. This extensive and caste-wise survey will reveal the racial affinities of the people of the South and it would be possible to compare the results with world-wide data collected by Boyd and Mourant (Boyd—Genetics and the Races of Man, 1950; and Mourant—Distribution of the Human Blood Groups, 1954). <i>Grant asked for :</i> <table> <tr> <td>Equipment :</td><td>Rs. 8,000</td></tr> <tr> <td>Contingencies :</td><td>Rs. 2,000</td></tr> <tr> <td>Staff (Special part-time allowances to Research Assistants)</td><td>Rs. 1,200</td></tr> <tr> <td>Total :</td><td>Rs. 11,200</td></tr> </table>	Equipment :	Rs. 8,000	Contingencies :	Rs. 2,000	Staff (Special part-time allowances to Research Assistants)	Rs. 1,200	Total :	Rs. 11,200
Equipment :	Rs. 8,000								
Contingencies :	Rs. 2,000								
Staff (Special part-time allowances to Research Assistants)	Rs. 1,200								
Total :	Rs. 11,200								
93	Subject : Manufacture of silicon carbide kiln furniture and globars—Dr. H. N. Roy, Head of the Ceramic Department, Banaras Hindu University, Banaras. <i>Aim & scope :</i> The object of this scheme is to investigate the manufacture of kiln furniture and globars from silicon carbide. Both items are at present being imported into India. <i>Author's record :</i> The author has carried out preliminary work on the making of the items from silicon carbide with ordinary firing devices with encouraging results.								

Recommendations of the Committee of the Board	Recommendations of the Board
92 p. 363[*] The Committee did not recommend the research scheme on blood groups by Dr. Irawati Karve as the subject did not come under the purview of the C. S. I. R.	92 p. 363 The Board did not recommend the scheme for sanction.

SUPPLEMENTARY AGENDA—RESEARCH SCHEMES

Item No.	Particulars														
	Devices for accurate high temperature firing of kiln furniture are required for carrying out the work under standard conditions. <i>Duration :</i> The scheme will be completed in two years. <i>Grant asked for :</i> <table> <tr> <td>Equipment :</td><td>Rs. 5,500</td></tr> <tr> <td>(Small roller mill, high temperature electric furnace.)</td><td></td></tr> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> <tr> <td>Staff :</td><td></td></tr> <tr> <td>(One S. R. A., one Mechanic and one Lab. Attendant.)</td><td>Rs. 5,577 (including allowances)</td></tr> <tr> <td></td><td><u>Total. Rs. 12,077 (including allowances)</u></td></tr> </table> <i>Research Committee's recommendation :</i> The Glass & Refractories Research Committee considered the scheme in its meeting held on February 11, 1955. It was agreed that Prof. Roy should conduct the preliminary work on the problem in his department. The Committee postponed consideration of the full scheme but recommended the following grant to enable Prof. Roy to purchase the necessary raw material (silicon carbide) as funds for this were not available from the University. The results of his findings would be discussed in the next meeting on the Committee, by which time he would have completed the two schemes, already under him : <table> <tr> <td>Contingencies</td><td>Rs. 1,000</td></tr> </table> 94 <i>Subject :</i> Study of refractory properties of diaspore from Hamirpur Dist. (U. P.) —Dr. M. L. Misra, Department of Glass Technology, Banaras Hindu University, Banaras. <i>Aim & scope :</i> It is proposed to carry out microscopic study, thermal and chemical analysis, study	Equipment :	Rs. 5,500	(Small roller mill, high temperature electric furnace.)		Contingencies	Rs. 1,000	Staff :		(One S. R. A., one Mechanic and one Lab. Attendant.)	Rs. 5,577 (including allowances)		<u>Total. Rs. 12,077 (including allowances)</u>	Contingencies	Rs. 1,000
Equipment :	Rs. 5,500														
(Small roller mill, high temperature electric furnace.)															
Contingencies	Rs. 1,000														
Staff :															
(One S. R. A., one Mechanic and one Lab. Attendant.)	Rs. 5,577 (including allowances)														
	<u>Total. Rs. 12,077 (including allowances)</u>														
Contingencies	Rs. 1,000														

<i>Recommendations of the Committee of the Board :</i>	<i>Recommendations of the Board</i>
93 p. 363-365 The Committee recommended a contingent grant of Rs. 1000/-only to Dr. H. N. Roy, Banaras, for carrying out preliminary work on the problem of manufacture of silicon carbide furniture and globars.	93 p. 363-365 The Board endorsed the recommendation of its Committee.

SUPPLEMENTARY AGENDA—RESEARCH SCHEMES

Item No.	Particulars
	of thermal behaviour, expansion, refractoriness and other refractory properties, of diaspore ($Al_2O_3 \cdot H_2O$) occurring along with pyrophyllite in Hamirpur Dist. (U. P.)
	<i>Author's record :</i>
	Preliminary microscopic studies of the mineral by the author combined with X-ray pattern investigation conducted in U. S. A. have confirmed the mineral to be diaspore and not kyanite
	<i>Grant asked for :</i>
	Equipment Nil
	Contingencies Rs. 1000
	Staff : (One J. R. A.) Rs. 3,080 (including allowances)
	Total : Rs. 4,080 (including allowances)
	<i>Research Committee's recommendation :</i>
	The Glass & Refractories Research Committee considered the scheme in its meeting held on February 10, 1955 and recommended the following financial assistance, subject to the satisfaction of the Chairman with regard to the information to be supplied by Dr. M. L. Misra. The scheme should be taken up after work on the existing scheme on 'Indian pyrophyllite' had finished and must be completed by 28-2-1956 :
	Equipment Nil
	Contingencies Rs. 1,000
	Staff : Rs. 1,320 (including allowances)
	(One J. S. A. from 1.9.55 to 28.2.56)
	Total : Rs. 2,320 (including allowances)
95	Subject : Glass & Refractories Research Schemes
	<i>Note :</i>
	95.0 The Glass & Refractories Research Committee in its meeting held on the 11th February 1955, considered the following new research schemes :—

Recommendations of the Committee of the Board	Recommendations of the Board
94 p. 365-367 The Committee recommended the research scheme on refractory properties of diaspore by Dr. M. L. Misra for approval. The Committee also recommended that the DSIR be authorised to sanction the necessary funds as proposed by the Research Committee when Dr. Misra was ready to take up the work. 95 0 p. 367 The Committee noted.	94 365-367 The Board endorsed the recommendations of its Committee. 95 0 p. 367 The Board noted.

SUPPLEMENTARY AGENDA—RESEARCH SCHEMES

Item No.	Particulars				
95.1	Influence of allotropic forms of silica upon the maturing and firing of the whiteware bodies and glazes etc.—Dr. S. S. Das, Banaras Hindu University. [The object of this scheme is to establish the real cause of defects in Indian pottery and porcelain and thereby lay down the limits of safe temperature for firing these products. Grant asked for : <table> <tr> <td>Equipment : Rs. 2,000</td><td>Contingencies : Rs. 2,000</td></tr> <tr> <td>Staff : Rs. 2,420</td><td>Total : Rs. 6,420 (including allowances)]</td></tr> </table> The methods proposed by Dr. Das although useful for identification purpose, could not yet be used for precise estimation of the various allotropic forms of silica present in fired bodies when all the three phases were present together. The Research Committee, therefore, did not recommend the scheme.	Equipment : Rs. 2,000	Contingencies : Rs. 2,000	Staff : Rs. 2,420	Total : Rs. 6,420 (including allowances)]
Equipment : Rs. 2,000	Contingencies : Rs. 2,000				
Staff : Rs. 2,420	Total : Rs. 6,420 (including allowances)]				
95.2	Manufacture of forsterite refractories—Dr. M. L. Misra, Banaras Hindu University, Banaras. [The object of this scheme is to prepare forsterite synthetically from magnesium silicate (Indian serpentine) and magnesite (dunite) and study its refractory properties. Grant asked for : <table> <tr> <td>Equipment : Rs. 1,500</td><td>Contingencies : Rs. 1,000</td></tr> <tr> <td>Staff : Rs. 3,135</td><td>Total : Rs. 5,635 (including allowances)]</td></tr> </table> The Research Committee noted that work on forsterite refractories was already being done at the National Metallurgical Laboratory and did not recommend the scheme.	Equipment : Rs. 1,500	Contingencies : Rs. 1,000	Staff : Rs. 3,135	Total : Rs. 5,635 (including allowances)]
Equipment : Rs. 1,500	Contingencies : Rs. 1,000				
Staff : Rs. 3,135	Total : Rs. 5,635 (including allowances)]				
95.3	Purification of Indian graphite for industrial use—Dr. S. Deb, Indian Association for the Cultivation of Science, Calcutta. [The object of this scheme is to develop a standard method for the purification of low grade Indian graphites (30-60 percent purity) for obtaining industrial grade graphite (upto 90% carbon content. Grant asked for : <table> <tr> <td>Equipment : Rs. 11,000</td><td>Contingencies : Rs. 2,327</td></tr> <tr> <td>Staff : Rs. 12,733</td><td>Total : Rs. 26,060 (including allowances)]</td></tr> </table>	Equipment : Rs. 11,000	Contingencies : Rs. 2,327	Staff : Rs. 12,733	Total : Rs. 26,060 (including allowances)]
Equipment : Rs. 11,000	Contingencies : Rs. 2,327				
Staff : Rs. 12,733	Total : Rs. 26,060 (including allowances)]				

Recommendations of the Committee of the Board	Recommendations of the Board
95. 1 p. 369 The Committee did not recommend the research scheme on influence of allotropic forms of silica by Dr. Das as it was considered that precise estimation of the various forms could not be made by the methods proposed.	95. 1 p. 369 The Board did not recommend the scheme for sanction.
95. 2 p. 369 The Committee did not recommend the research scheme on forsterite refractories by Dr. Misra as similar work was being done at the National Metallurgical Laboratory.	95. 2 p. 369 The Board did not recommend the scheme for sanction.

Item No.	Particulars								
	Dr. Deb's reply on the various points raised was still awaited. The Committee while appreciating the importance of need for more work on the purification of graphite for use in industry and atomic energy projects did not recommend the scheme at this stage for want of further information. Dr. Deb had also asked for salary for himself which was not admissible under C. S. I. R. rules. 95.4 Staining of glassware—Dr. H. J. Arnika, Banaras Hindu University, Banaras. [The object of this scheme is to carry out a systematic investigation of the process of staining glass by silver salts with the object of making the process commercially successful. Production of stains by other metals and their compounds is also proposed to be investigated at a later stage. Grant asked for : <table> <tr> <td>Equipment : Rs. 2,000</td><td>Contingencies : Rs. 744</td></tr> <tr> <td>Staff : Rs. 2,420</td><td>Total : Rs. 5,164 (including allowances)</td></tr> </table> Dr. Arnika would be going out of India shortly, and had suggested Mr. D. K. Patwardhan of Banaras Hindu University, as alternate. The Committee postponed consideration of the scheme till the time Dr. Arnika could take up the work himself on return from abroad. 95.5 Studies on the composition and fundamental physico-chemical properties of ceramic clays in India—Dr. A. K. Bhattacharya, Agra College, Agra. [The object of this scheme is to carry out a systematic investigation of the composition, structure and physico-chemical properties of Indian ceramic clays. Grant asked for : <table> <tr> <td>Equipment : Rs. 10,000</td><td>Contingencies : Rs. 1,850</td></tr> <tr> <td>Staff : Rs. 2,420</td><td>Total : Rs. 14,270 (including allowances)</td></tr> </table> The scheme would be duplication of the work already being done at the Central Glass & Ceramic Research Institute, on study of the Indian clays as a long range programme. The Committee did not recommend the scheme.	Equipment : Rs. 2,000	Contingencies : Rs. 744	Staff : Rs. 2,420	Total : Rs. 5,164 (including allowances)	Equipment : Rs. 10,000	Contingencies : Rs. 1,850	Staff : Rs. 2,420	Total : Rs. 14,270 (including allowances)
Equipment : Rs. 2,000	Contingencies : Rs. 744								
Staff : Rs. 2,420	Total : Rs. 5,164 (including allowances)								
Equipment : Rs. 10,000	Contingencies : Rs. 1,850								
Staff : Rs. 2,420	Total : Rs. 14,270 (including allowances)								

Recommendations of the Committee of the Board	Recommendations of the Board
95. 3 p. 369-371 The Committee did not recommend the research scheme on purification of Indian graphite by Dr. S. Deb.	95. p. 369-371 The Board did not recommend the scheme for sanction.
95. 4 p. 371 The Committee noted.	95. 4 p. 371 The Board noted.
95. 5 p. 371 The Committee did not recommend the research scheme on study of ceramic clays by Dr. A.K. Bhattacharya, as this was already under way at the Central Glass and Ceramic Research Institute.	95. 5 p. 371 The Board did not recommend the scheme for sanction.

SUPPLEMENTARY AGENDA—RENEWALS

Item No.	Particulars										
96	Subject : Translation of Bhartiya Jyotis Shastra from Marathi to English by Prof. M. N. Saha, F. R. S., Calcutta. Note : Prof. M. N. Saha had proposed the translation of Bhartiya Jyotish Shastra by Shri Balkrishna Dixit, which is a unique source book of ancient and medieval Indian astronomy, from Marathi to English. The proposal was approved in principle by the B. S. I. R. in its meeting held on March 10, 1954. Prof. Saha has intimated the following financial estimates for translation and printing. <table><tr><td>Cost of scrutinizing, copying, translation etc.</td><td>Rs. 2,100</td></tr><tr><td>Cost of printing 4000 copies of 1,000 pages each</td><td>Rs. 18,000</td></tr><tr><td>Cost of paper</td><td>Rs. 11,000</td></tr><tr><td>Cost of binding</td><td>Rs. 8,000</td></tr><tr><td>Total :</td><td>Rs. 39,100</td></tr></table>	Cost of scrutinizing, copying, translation etc.	Rs. 2,100	Cost of printing 4000 copies of 1,000 pages each	Rs. 18,000	Cost of paper	Rs. 11,000	Cost of binding	Rs. 8,000	Total :	Rs. 39,100
Cost of scrutinizing, copying, translation etc.	Rs. 2,100										
Cost of printing 4000 copies of 1,000 pages each	Rs. 18,000										
Cost of paper	Rs. 11,000										
Cost of binding	Rs. 8,000										
Total :	Rs. 39,100										
97	Subject : Glass & refractories research schemes (renewals) Note : 97.0 The Glass & Refractories Research Committee in its meeting held on February 11, 1955, at Banaras Hindu University, considered the renewal applications in respect of following schemes in progress and made recommendations : 97.1 (a) Investigations on the critical conditions of producing plaster of Paris suitable for making moulds from gypsum available in the country, and (b) Utilization of waste plaster of Paris moulds—Prof. H. N. Roy, Banaras Hindu University. <table><tr><td>Grant asked for :</td><td>Equipment : Nil</td><td>Contingencies : Rs. 500</td></tr><tr><td></td><td>Staff : Rs. 2,838</td><td>Total : Rs. 3,338 (including allowances)</td></tr></table> Prof. Roy informed that the work on item (b) would finish by 28-2-1955.	Grant asked for :	Equipment : Nil	Contingencies : Rs. 500		Staff : Rs. 2,838	Total : Rs. 3,338 (including allowances)				
Grant asked for :	Equipment : Nil	Contingencies : Rs. 500									
	Staff : Rs. 2,838	Total : Rs. 3,338 (including allowances)									

Recommendations of the Committee of the Board	Recommendations of the Board								
96 p. 373 The Committee did not consider that there would be a demand for 4,000 copies of the English translation of the work on Bharatiya Jyotis Shashtra by Shri Dixit. The Committee recommended the following grant for printing 750 copies: <table> <tr> <td>Cost of scrutinizing, typing etc.</td><td>Rs. 2,000</td></tr> <tr> <td>Cost of printing</td><td>Rs. 10,000</td></tr> <tr> <td>Cost of paper and binding</td><td>Rs. 3,500</td></tr> <tr> <td>Total</td><td>Rs. 15,500</td></tr> </table>	Cost of scrutinizing, typing etc.	Rs. 2,000	Cost of printing	Rs. 10,000	Cost of paper and binding	Rs. 3,500	Total	Rs. 15,500	96. p. 373 The Board endorsed the recommendation of its Committee.
Cost of scrutinizing, typing etc.	Rs. 2,000								
Cost of printing	Rs. 10,000								
Cost of paper and binding	Rs. 3,500								
Total	Rs. 15,500								
97. 0 p. 373 The Committee noted	97. 0 p. 373 The Board noted.								

SUPPLEMENTARY AGENDA—RENEWALS

375

Item No.	Particulars
	The Committee recommended extension of part (a) of the scheme till 31. 8. 55 with the following grant :—
	Equipment Nil
	Contingencies Rs. 500
	Staff : (one JRA) Rs. 2,838 (including allowances)
	Total : Rs. 3,338 (including allowances)
97.2	Studies of refractory & ceramic properties of Indian pyrophyllite, by Dr. M. L. Misra, Banaras Hindu University.
	Grant asked for : Equipment : Nil Contingencies : Nil
	Staff : Rs. 1,320 Total : Rs. 1,320 (including allowances)
	The Committee recommended extension of the scheme till 31. 8. 55 with the following grant :
	Equipment Nil
	Contingencies Nil
	Staff Rs. 1,320 (including allowances)
	Total : Rs. 1,320 (including allowances)
97.3	Studies of plasticity and its relation to other physical and chemical properties of Indian clays by Dr. D. Lahiri, Calcutta University, Calcutta.
	Grant asked for : Equipment : Nil Contingencies : Rs. 2,000
	Staff : Rs. 3,570 Total : Rs. 5,570 (including allowances)
	The Committee recommended extension of the scheme till 28.2.56 with the following grant :
	Equipment Nil
	Contingencies Rs. 1,500
	Staff : (One J. S. A.) Rs. 3,570 (including allowances)
	Total Rs. 5070 (including allowances)

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Recommendations of the Committee of the Board	Recommendations of the Board
97. 1 p. 373-375 The Committee recommended continuance of the research scheme on production of plaster of Paris for moulds by Dr H.N. Roy for six months only with the following grant: Equipment Nil Contingencies Rs. 500 Staff Rs. 2,880 including allowances Total Rs. 3380 " "	97. 1 p. 375 The Board endorsed the recommendation of its Committee.
97. 2 p. 375 The Committee recommended the following grant for continuance of the research scheme on Indian pyrophyllite by Dr. M.I. Misra for six months only: Equipment Nil Contingencies Nil Staff Rs. 1,340 including allowances Total Rs. 1,340 " "	97. 2 p. 375 The Board endorsed the recommendation of its Committee.
97. 3 p. 375 The Committee recommended the following grant for continuance of the research scheme on plasticity by Dr. Lahiri during 1955-56. Equipment Nil Contingencies Rs. 1,500 Staff Rs. 3,110 including allowances Total Rs. 4,610 " "	97. 3 p. 375 The Board endorsed the recommendation of its Committee.

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Recommendations of the Committee of the Board	Recommendations of the Board								
97. 4 p. 377 The Committee recommended the following grant for continuance of the research scheme on Rewa sillimanite by Dr. Mithal during 1955-56: <table> <tr> <td>Equipment</td> <td>Rs. 3,500</td> </tr> <tr> <td>Contingencies</td> <td>Rs. 1,500</td> </tr> <tr> <td>Staff</td> <td>Rs. 2,371 including allowances</td> </tr> <tr> <td>Total</td> <td>Rs. 7,371 " "</td> </tr> </table>	Equipment	Rs. 3,500	Contingencies	Rs. 1,500	Staff	Rs. 2,371 including allowances	Total	Rs. 7,371 " "	97. 4 p. 377 The Board endorsed the recommendation of its Committee.
Equipment	Rs. 3,500								
Contingencies	Rs. 1,500								
Staff	Rs. 2,371 including allowances								
Total	Rs. 7,371 " "								
97. 5 p. 377 The Committee did not recommend continuance of the research scheme on 'X-ray study of Indian Clays.'	97. 5 p. 377 The Board endorsed the recommendation of its Committee.								

Item No.	Particulars				
98	Subject : Applications for renewals of grants-in-aid for schemes of research for the year 1955-56.				
	Note :				
	The remaining renewal applications, which have not been considered yet, are listed below :—				
S. No.	Scheme	<u>GRANT REQUESTED FOR 1955-56</u>			
		Equipment	Contingencies	Staff	Total
(A) ESSENTIAL OILS RESEARCH COMMITTEE					
1.	Experimental verification of the formulae for the estimation of alcoholic contents in the essential oils synthetic blends by Dr. J. B. Lal, Kanpur.	Nil	2,160	Nil	2,160
(B) STATISTICS, STANDARDS & QUALITY CONTROL RESEARCH COMMITTEE					
1.	Research and training in statistical methods of quality control by Dr. N. S. R. Sastry.	500	1,000	9,720	11,220
			A block grant of Rs. 10,000 has been asked for.		
(C) VANASPATI RESEARCH ADVISORY COMMITTEE					
1.	Stability of crude, refined and hydrogenated oils of different melting points etc., by Dr. B. C. Guha.	Nil	2,000	6,402	8,402
2.	Utilisation and processing of cotton-seed oil for edible purposes by Dr. V. Subrahmanyam, Mysore.	Nil	2,000	5,705	7,705
3.	Studies on iso-oleic acids from vanaspati by Dr. V. N. Patwardhan.	Nil	2,000	4,452	6,452

Recommendations of the Committee of the Board	Recommendations of the Board																														
98 p. 379 A. Essential Oils The Committee recommended the following renewal grant to Dr. J.B. Lal for the research scheme on 'Alcoholic contents of synthetic blends'. <table><tr><td>Equipment</td><td>Unspent balance</td></tr><tr><td>Contingencies</td><td>Rs. 2,000</td></tr><tr><td>Staff</td><td>Nil</td></tr><tr><td colspan="2"> </td></tr><tr><td>Total</td><td>Rs. 2,000 (plus unspent balance)</td></tr></table> B. Quality Control The Committee recommended that the DSIR be authorised to take necessary action departmentally after obtaining the recommendation of the Research Committee. C. Vanaspati The Committee recommended the following renewal grants for 1955-56: <table><tr><td></td><td>E</td><td>C</td><td>S</td><td>Total</td></tr><tr><td>1.</td><td>Nil</td><td>Rs. 2,000</td><td>Rs. 6,396</td><td>Rs. 8,396</td></tr><tr><td>2.</td><td>Nil</td><td>Rs. 2,000</td><td>Rs. 5,705</td><td>Rs. 7,705</td></tr><tr><td>3.</td><td>Nil</td><td>Rs. 2,000</td><td>Rs. 4,419</td><td>Rs. 6,419</td></tr></table>	Equipment	Unspent balance	Contingencies	Rs. 2,000	Staff	Nil			Total	Rs. 2,000 (plus unspent balance)		E	C	S	Total	1.	Nil	Rs. 2,000	Rs. 6,396	Rs. 8,396	2.	Nil	Rs. 2,000	Rs. 5,705	Rs. 7,705	3.	Nil	Rs. 2,000	Rs. 4,419	Rs. 6,419	98 p. 379 A. Essential Oils The Board endorsed the recommendation of its Committee. B. Quality Control The Board endorsed the recommendation of its Committee. C. Vanaspati The Board endorsed the recommendations of its Committee.
Equipment	Unspent balance																														
Contingencies	Rs. 2,000																														
Staff	Nil																														
Total	Rs. 2,000 (plus unspent balance)																														
	E	C	S	Total																											
1.	Nil	Rs. 2,000	Rs. 6,396	Rs. 8,396																											
2.	Nil	Rs. 2,000	Rs. 5,705	Rs. 7,705																											
3.	Nil	Rs. 2,000	Rs. 4,419	Rs. 6,419																											

SUPPLEMENTARY AGENDA—RENEWALS

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Item No.	Particulars				
S. No.	Scheme	GRANTS REQUESTED FOR 1955-56.			
		Equipment	Contingencies	Staff	Total
4.	Literature survey on oils and fats by Dr. V. Subrahmanyam.	Nil	250	6,912	7,162
(D) MISCELLANEOUS SCHEMES					
1.	Mineragraphic study of the vanadium bearing titaniferous magnetic ores of Mayurbhanj by Prof. N. N. Chatterjee, Calcutta.	Nil	500 (for 6 months only)	3,842	4,342
2.	Flora of Delhi State by Prof. P. Maheshwari, Delhi.	Nil	1,000	6,216	7,216
3.	Protection of timber against attack by marine organisms by President, Forest Research Institute & Colleges, Dehradun	Block grant of Rs. 10,000.			

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Recommendations of the Committee of the Board	Recommendations of the Board																								
98 p. 381 The Committee recommended the following grant for continuance of the research scheme on 'Literature survey of oils and fats' by Dr. Subrahmanyam: <table> <tr> <td>Equipment</td><td>Nil</td></tr> <tr> <td>Contingencies</td><td>Rs. 250</td></tr> <tr> <td>Staff</td><td>Rs. 6,912 including allowances</td></tr> <tr> <td>Total</td><td>Rs. 7,162 " "</td></tr> </table> D. Miscellaneous Schemes. The Committee recommended the following renewal grant for 1955-56. <table> <tr> <td></td><td>C</td><td>S</td><td>Total</td></tr> <tr> <td>1.</td><td>Rs. 500</td><td>Rs. 1875</td><td>Rs. 2,375</td></tr> </table> The scheme be renewed for six months only during which period the ore-dressing and beneficiation aspects may be studied. <table> <tr> <td>2.</td><td>Rs. 1,000</td><td>Rs. 6,180</td><td>Rs. 7,180</td></tr> <tr> <td>3.</td><td></td><td>Block grant of</td><td>Rs. 10,000</td></tr> </table>	Equipment	Nil	Contingencies	Rs. 250	Staff	Rs. 6,912 including allowances	Total	Rs. 7,162 " "		C	S	Total	1.	Rs. 500	Rs. 1875	Rs. 2,375	2.	Rs. 1,000	Rs. 6,180	Rs. 7,180	3.		Block grant of	Rs. 10,000	98. p. 381 The Board endorsed the recommendation of its Committee. D. Miscellaneous Schemes. The Board endorsed the recommendations of its Committee.
Equipment	Nil																								
Contingencies	Rs. 250																								
Staff	Rs. 6,912 including allowances																								
Total	Rs. 7,162 " "																								
	C	S	Total																						
1.	Rs. 500	Rs. 1875	Rs. 2,375																						
2.	Rs. 1,000	Rs. 6,180	Rs. 7,180																						
3.		Block grant of	Rs. 10,000																						

SUPPLEMENTARY AGENDA—RENEWALS

Item No. 99

Subject : Renewal of grants sanctioned for the Chairmen of the Research Committees for the year 1955-56.

Synopsis :

Chairmen of the various Research Committees have asked for the following grants for the year 1955-56 :-

S.No.	Committee	Contingencies	STAFF		Total
			Particulars	Amount	
1	2	3	4	5	6
(1)	Chemical Research Committee	300	1 part-time Tech. Assistant on Rs. 40/- p. m.; 1 Stenographer on Rs. 50/- p. m.; 1 part-time peon on Rs. 10/- p. m.	1,200	1,500
(2)	Pharmaceutical & Drugs Research Committee	300	1 Clerk-cum-typist in the scale of Rs. 55-3-85-EB-4-125-5-130.	1,463	1,763
(3)	Physical Research Committee	100	Special allowance for doing the work of the Physical Research Committee at Rs. 40/ p. m.	480	580
(4)	Glass & Refractories Research Committee	800	1 J. T. A. (160-10-330); 1 Steno-typist in the scale of 55-3-85-EB-4-125-5-130 + 20/-	5,424	6,224
(5)	Biochemical Research Committee	350	Special allowance to Secretary & Steno.	1,148	1,498
(6)	Plastics Research Committee	300	1 part-time Tech. Assistant on Rs. 50/-p.m. for 2 months; 1 part-time Stenographer @ 20% of pay; 1 Tech. Asst. on Rs. 300 p.m. (250-25-500)	5,516	5,816
(7)	Vegetable Oils Research Committee	300	1 J. T. A. (160-10-330); Special allowance for part time typist and clerk.	3,370	3,670
(8)	Metals Research Committee	300	1 Stenographer on Rs. 136/- p. m. in the scale of Rs. 80-5-120-EB-8-200-10/2-220. Contribution to Tatas towards honorarium for the Technical Asstt. @ Rs. 400/-p.m.	7,120	7,420
(9) (a)	Radio Research Committee	800	1 Senior Scientific Officer in the scale of Rs. 350-30/2-410-30-590-EB-770-40-850. 1 Stenographer in the scale of Rs. 160-10-330. 1 Typist clerk in the scale of Rs. 55-3-85-4-125-5-130.	14,345	15,145

Recommendations of the Committee of the Board	Recommendations of the Board
99. 0 p. 383 The Committee recommended the following grant to Chairmen of the Research Committees for continuance of their staff. 1. Chemical Research Committee. Contingencies Rs. 300 Staff Rs. 1,200 including allowances Total Rs. 1,500 " " 2. Pharmaceuticals & Drugs Research Committee. Contingencies Rs. 300 Staff Rs. 1,463 including allowances Total Rs. 1,763 " " 3. Physical Research Committee. Contingencies Rs. 100 Staff Rs. 480 Total Rs. 580 4. Glass & Refractories Research Committee. Contingencies Rs. 300 Staff Rs. 5,424 including allowances Total Rs. 5,724 " " 5. Biochemical Research Committee. Contingencies Rs. 300 Staff Rs. 1,148 including allowances Total Rs. 1,448 " " 6. Plastics Research Committee. Contingencies Rs. 300 Staff Rs. 5,516 including allowances Total Rs. 5,816 " " 7. Vegetable Oils Research Committee. Contingencies Rs. 300 Staff Rs. 3,370 including allowances Total Rs. 3,670 " " 8. Metals Research Committee. Contingencies Rs. 300 Staff Rs. 7,125 including allowances Total Rs. 7,425 " " 9. A. Radio Research Committee. Contingencies Rs. 500 Staff Rs. 12,322 including allowances Total Rs. 12,822 " "	99 1-9 A p. 383 The Board endorsed the recommendations of its Committee.

SUPPLEMENTARY AGENDA—RENEWALS

S.No.	Committee	Contingencies	STAFF		Total
			Particulars	Amount	
1	2	3	4	5	6
	(b) Data-coordination and Publication	3,000 + 3,000 for the purchase of projection equipment steel rack 12' x 8' and file cabinets.	1 Senior Scientific Assistant in the scale of Rs. 250-25-500; 3 Junior Res. Assistants in the scale of Rs. 160-10-330. 1 Statistical Assistant in the scale of Rs. 160-10-300 1 Draughtsman in the scale of Rs. 100-5-125-6-155-6-185. 1 Clerk in the scale of Rs. 55-3-85-EB-4-125-5-130. 1 Clerkcum-typist in the scale of Rs. 55-3-85-EB-4-125-5-130. 3 Laboratory attendants in the scale of Rs. 30-1/2-35.	22,467	28,467
	(c) Raw Materials Sub-Committee	400 + 1,100 for 1 type-writer	1 Junior Research Assistant in the scale of Rs. 160-10-330. 1 Steno-typist in the scale of Rs. 55-3-85-EB-4-125-5-130 + special pay of Rs. 20 p. m.	4,620	6,120
(10)	Internal Combustion Engines Research Committee	300	1 Secretary on Rs. 300 p. m. in the scale of Rs. 250-25-500. 1 P. A. to the Chairman on Rs. 160 p. m. in the scale 160-10-330.	7,498	7,798
(11)	Fuel Research Committee	500 + 1,000 for typewriter.	1 Assistant in the scale 160-10-330-EB-15-450	5,421	6,921
(12)	Essential Oils Research Committee	300	1 Steno-typist in the scale 55-3-85-EB-4-125-5-130 + Rs. 20 Stenography allowance.	1,572	1,872
(13)	Cellulose Research Committee	300	1 Steno-typist in the scale of Rs. 55-3-85-EB-4-125-5-130 + special pay Rs. 20 p.m.	1,803	2,103
(14)	Atmospheric Research Committee	240	1 Stenographer in the scale Rs. 80-5-120-8-200-EB-10-1/2-220.	2,233	2,473
(15)	Leather Research Committee	100	1 Part-time Technical Assistant on Rs. 40 p. m.	480	580
(16)	Committee on the Measurement of Geological Time in India.	300	1 Part time Stenographer on 20% of pay.	601	901
(17)	Salt Research Committee.	300	1 Steno-typist in the scale of Rs. 55-3-85-EB-4-125-5-130 + Rs. 20 special pay.	2,172	2,472

Recommendations of the Committee of the Board	Recommendations of the Board
99. p. 385 9. B. Data-coordination and publication. Equipment Rs. 3,000 Contingencies Rs. 2,000 Staff Rs. 13,832 including allowances Total Rs. 18,832 " "	
9. C Raw Materials Sub-Committee. Equipment Rs. 900 Contingencies Rs. 300 Staff Rs. 4,620 including allowances Total Rs. 5,820 " "	
10. Internal Combustion Engines Research Committee. Contingencies Rs. 300 Staff Rs. 10,127 including allowances Total Rs. 10,427 " "	
11. Fuel Research Committee Equipment Rs. 900 for typewriter. Contingencies Rs. 300 Staff Rs. 5,421 including allowances Total Rs. 6,621 " "	
12. Essential Oils Research Committee. Equipment Rs. 900 for typewriter Contingencies Rs. 300 Staff Rs. 1,584 including allowances Total Rs. 2,784 " "	
13. Cellulose Research Committee. Contingencies Rs. 300 Staff Rs. 1,810 including allowances	



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99. 9 B-17 p. 385

The Board endorsed the recommendations of its Committee.