# ESTIMATES COMMITTEE 1959-60 SEVENTY-SIXTH REPORT

# (SECOND LOK SABHA)

# MINISTRY OF SCIENTIFIC RESEARCH AND CULTURAL AFFAIRS

PART I

Council of Scientific and Industrial Research



LOK SABHA SECRETARIAT NEW DELHI March, 1960 Phalguna, 1881 (Saka) Price : Rs. 1.60

# CORRIGENDA

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Seventy-sixth Report of the Estimates Committee on the Ministry of Scientific Research & Cultural Affairs Part I C.S.I.R.

- Page (iii), Item XV, Line 1, for 'tin' read 'in' Page 13, Para 33, Line 18, After 'choice' add list
- Page 28, Para 63, Line 7, for 'up of read 'up to' Page 30, Line 16, from top, for 'benefication' read 'beneficiation'
- Page 31, Para 69, Line 11, for 'Dulcital' read 'Dulcitol.
- 31, Para 69, Lines 18 & 19 for 'sxploitation' Page réad 'exploitation'
- 87, S. No. 21, Col. 4, for 'June, 1952' read Page
- Page 123, S. No. 34, Col. 3, Line 3, for 'Scholarhships' read 'Scholarships' Page 123, S. No. 35, Col 3, Line 3, for 'receipient' read 'recipient' Page 124, S. No. 37, Col. 3, Line 8, for 'meking' read 'making' Page 124, S. No. 39, Col 3, Line 3, for 'infanct' read 'infant'

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#### 1959-60

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Shri K. Ranganadham-Under Secretary.

\*Elected w.e.f. 19th December, 1959 vice Shri Mathuradas Mathur resigned.

#### INTRODUCTION

l, the Chairman, Estimates Committee, having been authorised by the Committee to submit the report on their behalf, present this Seventy-sixth Report on the Ministry of Scientific Research and Cultural Affairs Part I— Council of Scientific and Industrial Research. The report deals with the Secretariat of the Council and general problems concerning the National Laboratories.

2. A statement showing an analysis of the recommendations contained in this report is also appended to the report (Appendix XXII).

3. The Committee wish to express their thanks to the Secretary of the Ministry of Scientific Research and Cultural Affairs and Director General, Scientific and Industrial Research and other Officers of the Council of Scientific and Industrial Research for placing before them the material and information that they wanted in connection with the examination of the Estimates. They also wish to thank Shri T. S. Subramanian, Director, Ahmedabad Textile Industry's Research Association. Ahmedabad, for giving evidence and making valuable suggestions to the Committee.

New DelHi-1; The 9th March, 1960. The 19th Phalguna, 1881 (Saka). H. C. DASAPPA, Chairman, Estimates Committee.

#### I. INTRODUCTORY

#### A. Position of Scientific Research in India prior to 1942

The role of scientific research in the progress of the country had not been recognised until very recently. The unsatisfactory position of scientific research in the country, and necessity of improving the same in the interests of industrial development were first prominently brought to light by the Industrial Commission (1918). Some progress was made in this direction during the intervening period between the two World Wars, but it was inadequate and unco-ordinated. The Government of India established in 1935 the Industrial Intelligence and Research Bureau with the object of "making a beginning and to lay the foundation on which a research organisation suitable for the needs of the country could later be constructed." An Industrial Research Council, consisting of representatives of the Central, Provincial and State Governments was also set up to advise on measures for the co-ordination and development of industrial research. A r branch of the Bureau was located in the Government Test research. House: Alipore (Calcutta), but its activities and scope were circumscribed by its limited finances, its annual budget being Rs. 2 lakhs.

2. The inadequacy of the Industrial Research Bureau was realised when the World War II broke out and the scientific resources of the country had to be mobilized for the war effort. Cessation of imports of various industrial materials on the one hand and an immense increase in the demand for the same on the other, brought out the pressing need for making India industrially self-sufficient and an efficient base for war supplies. The Industrial Research Bureau was, therefore. kept in abeyance, and in 1940 the Government of India established the Board of Scientific and Industrial Research, for a period of twoyears in the first instance, "to advise Government as to the lines on which industrial research should be conducted and the channels into which it should be guided in order best to serve the object of ensuring the co-ordinated development of Indian industries, particularly of those, the importance and possibilities of which have been prominently of brought into the forefront as a result of the conditions created by the war". The gradual progress in the activities of the Board led up to the question of commercial utilisation of the results of research. which culminated in the establishment in 1941 of an Industrial Research Utilisation Committee.

#### **B. A Central Organisation**

3. The experience gained in the working of the Board suggested the desirability of setting up a Central organisation for planning research, bringing about co-ordination in research activities and promoting the application of research in the various fields of national development. The Government decided in 1942 to create a fund called the Industrial Research Fund with an annual non-lapsable grant of Rs. 10 lakhs for a period of five years for the purpose of fostering industrial development in the country and the Council of Scientific and Industrial Research (CSIR) was constituted as an autonomous body under the provision of the Registration of Societies Act XXI of 1860 to administer the fund. The administration of the Council was vested in a Governing Body nominated by the Government and the Board of Scientific and Industrial Research was assigned the role of advising the Governing Body. The Government of India announced in 1944 a grant of Rs. 1 crore for the construction and equipment of "a chain of research institutions". The Tata Trust made a substantial donation of Rs. 20 lakhs towards the establishment of National Chemical and Metallurgical Laboratories.

#### C.Research Planning

4. In December 1943, the Council appointed a Research Planning Committee with Shri R. K. Shanmukham Chetty as Chairman to survey the existing facilities for scientific and industrial research in the country and suggest measures for co-ordination, planning and development of such research to meet post-war needs. The report of the Committee was submitted to the Council in 1945. Among the recommendations of the Committee was one relating to the establishment of a Central Research Organisation for:

- (i) organising and maintaining the national laboratories and specialised research institutes;
- (ii) encouraging research by grants-in-aid, scholarships and fellowships;
- (iii) instituting scholarships for the training of technical and research personnel;
- (iv) co-ordinating the existing research activities; and
  - (v) functioning as a National Trust for patents.

Many of the functions of the National Research Council proposed by the Committee were being carried out by the CSIR. There was, however, evident need for enlarging the scope of its activities.

#### D. Position since Independence

5. After the attainment of Independence, scientific research received not only further recognition but also encouragement and impetus. Scientific research was announced as a portfolio under the Prime Minister in August, 1947. This was followed by the creation of the Department of Scientific Research in June, 1948 which was subsequently expanded into a Ministry. The pace of the establishment of the National Laboratories, plans for which had been prepared and foundation stones for some of which had been laid was quickened after Independence and new Laboratories were planned and built. 6. The Governing Body of the CSIR appointed in August 1947 a Committee with Sir Ardeshir Dalal as Chairman to review the work of the Council. The Committee confined its attention to the utilisation aspects of the researches carried out "so as to suggest ways and means of rendering that aspect of the work of the Council of greater practical utility" That Committee made some important recommendations which resulted *inter alia* in the establishment of a Board of Engineering Research in 1950 and of the National Research Development Corporation in 1953.

7. The President of the Council appointed another Committee in February, 1954 with Sir Alfred C. Egerton as Chairman to appraise the researches, both pure and applied, conducted at the National Laboratories and sponsored at Universities and other research institutions, suggest lines for future development and to report generally on the organisation and the working of the Council of Scientific and Industrial Research. The Committee submitted their report in April. The Committee made a number of suggestions directed to-1954 wards increasing the operational efficiency of the organisation. The Governing Body of the CSIR considered the Report of the Egerton Committee in September, 1954 and appointed a Special Committee with Dr. J. C. Ghosh as Chairman to examine it. The Report of the Special Committee was submitted in 1955 and considered by the Governing Body. Some of the important recommendations made by the Special Committee and approved by the Governing Body included the decentralisation of the powers of the Governing Body and their delegation to duly constituted Executive Councils and Scientific Advisory Committees of all the Laboratories and the merger of the Board of Engineering Research with the Board of Scientific and Industrial Research.

8. The CSIR has at present a chain of 25 National Laboratories, a list of which appears in Appendix I. Besides them, the Council has also set up a number of research centres and units. With a view to promoting scientific development in the country, it also provides financial assistance to *ad hoc* schemes of research in universities and research institutions where normal facilities for undertaking such work are available.

#### **II. ORGANISATION**

9. The Council of Scientific and Industrial Research is an autonomous body registered under the Registration of Societies Act XXI of 1860. The Prime Minister of India is its *ex officio* President, and the Minister of Scientific Research and Cultural Affairs is its *ex officio* Vice-President. Its members are the members of the Governing Body. There is provision for the Government of India to appoint other persons also to the Council. A chart showing the organisational set-up of the Council is given in Appendix I.

#### A. Functions

- 10. The functions assigned to the Council are:---
  - (1) the promotion, guidance and co-ordination of scientific and industrial research in India including the institution and the financing of specific researches;
  - (2) the establishment or development and assistance to special institutions or departments of existing institutions for specific studies of problems affecting particular industries and trades;
  - (3) the establishment and award of research studentships and fellowships;
  - (4) the utilisation of the results of researches conducted under the auspices of the Council towards the development of industries in the country and the payment of a share of royalties arising out of the development of the results of researches to those who are considered as having contributed towards the pursuing of such researches;
  - (5) the establishment, maintenance and management of laboratories, workshops, institutes and organisations to further specific and industrial research and to utilise and exploit any discovery or invention likely to be of use to Indian industries;
  - (6) the collection and dissemination of information in regard not only to research but also to industrial matters generally;
  - (7) publication of scientific papers and a journal of industrial research and development; and
  - (8) any other activities to promote generally the objects of the resolution.

#### B. The Governing Body

11. The Administration, direction and control of the organisation of the Council of Scientific and Industrial Research is vested in a Governing Body consisting of eminent scientists, industrialists and administrators. The present strength of the Governing Body is 30. The Prime Minister is the President and the Minister of Scientific Research and Cultural Affairs is the Vice-President of the Governing Body. The management of the affairs and funds of the Council is vested in the Governing Body, subject to such limitations in respect of expenditure as the Central Government may from time to time impose. All decisions on matters of policy, annual budget of the Council and sanctioning grants for research schemes and other matters falling within the scope of the activities of the Council are taken by the Governing Body.

#### C. Finance Sub-Committee

12. There is a Finance Sub-Committee of the Governing Body, of which the Financial Adviser of the CSIR and the Director-General, Scientific & Industrial Research are ex officio members. The main functions of the Finance Sub-Committee are to scrutinise the accounts and budget estimates, to consider and to recommend major works and purchases and to review the finances of the Council from time to time.

#### D. The Board of Scientific & Industrial Research

13. The Board of Scientific and Industrial Research is the principal advisory body of the Governing Body. All proposals relating to scientific, technical or technological objects of the Society, whether research or development, are referred to this body for advice. The Board which ordinarily meets twice a year makes recommendations to the Governing Body as to the lines on which scientific and industrial research has to be developed. The Board of Scientific and Industrial Research consists of members representing science, engineering, industry and appropriate Departments of the Government of India. It is constituted once in three years and its present strength is 27. For particular meetings of the Board additional members can be co-opted.

14. The Committee find that there is a tendency to nominate almost the same members to the Board from time to time. They consider that such a system makes for an element of rigidity in approach and may retard the flow of fresh ideas so very necessary for the principal advisory body for planning fruitful scientific research. They are of the view that it would be conducive to such a flow of fresh ideas if the constitution of the Board provides for the retirement of one-third of the members every year, their places being filled up by new nominations. In proper cases, a retiring member or members may also be renominated. The Committee suggest that the new Board may be constituted on the above basis.

#### E. Research Committees

15. The Board of Scientific and Industrial Research is assisted in its work by 13 Research Committees which are standing committees on various disciplines. The committees are constituted by the Governing Body with experts in the field of science, engineering and technology, Central and State Government organisations and industries. The Director General, Scientific and Industrial Research is an *ex officio* member of all such Committees. Most of the Committees consist of 15 to 18 members and are constituted once in three years. They were last reconstituted on 1-4-1959. The functions of the Research Committees are:—

- (i) to advise on matters pertaining to scientific and industrial research in their respective fields;
- (ii) to survey the work done, facilities and personnel available at different centres and to formulate planned programme of research for the advancement of knowledge and its application; and
- (iii) to initiate research and recommend grants for research schemes, watch their progress and co-ordinate them.

16 A view was expressed by the representative of the Ahmedabad Textile Industry's Research Association before the Committee that the Research Committees of the Council were too big and were having too many specialisations entrusted to them and that they could well afford to be smaller with sub-Committees, if necessary, reporting to them. He added that one of the Research Committees of which he was a member had to scrutinise as many as 120 research projects in two days which was not very satisfactory.

The Committee generally agree with this view and suggest that the Research Committees may be made more compact and that they should have sub-Committees composed of specialists in the particular fields to which the schemes relate, for their proper scrutiny. If necessary, the schemes may subsequently be placed before the main Committee for final approval.

17. The Committee consider that as in the case of the Board of Scientific and Industrial Research, the infusion of fresh ideas in the deliberations of the Research Committees is essential and this should be secured by constituting the Committees in the same manner as has been suggested in the case of the Board of Scientific and Industrial Research. The representative of the Ministry in his evidence before the Committee shared their opinion that the Research Committees would benefit if such a principle were adopted.

#### F. Nature and Extent of Government Control

18. The Ministry of Scientific Research and Cultural Affairs provides the administrative link between the Government of India and The grants made to the Council are included in the budget the CSIR. of this Ministry. As already stated, the Prime Minister is the President and the Minister of Scientific Research & Cultural Affairs is the The Secretary of the Ministry is the Vice-President of the Council. Director General, Scientific and Industrial Research. The Joint Secretary of the Ministry of Finance who is Financial Adviser to the Ministry is also the Financial Adviser to the Council. The affairs of the Council are looked after by the Governing Body of the Council in accordance with its Rules and Regulations as approved by the Government of India. It has been stated by the Council that its accounts are audited by the Comptroller and Auditor-General of India and the annual statements of accounts as certified by him together with the audit report thereon are forwarded annually to the Ministry of Scientific Research and Cultural Affairs for laying before the Parlia-The Committee, however, find that the annual statement ment. of accounts of the Council together with the Audit Report thereon has not so far been laid before Parliament. The Committee suggest that these may be laid before Parliament regularly from this year onwards.

#### G. Statutory Status for the Council

19. The Committee would like to refer here to the following observations made by the PAC in para 98 of their Sixteenth Report for the year 1955-56:—

"The Committee hold the view that, as a matter of general principle, where it is desired that continuing functions involving substantial expenditure should be exercised by autonomous bodies like the Council of Scientific and Industrial Research, the powers and duties to be exercised should be defined by specific statute. The Committee trust that Government would take the first convenient opportunity to embody the functions of the Council of Scientific and Industrial Research in a statute."

The PAC reiterated this recommendation twice subsequently but the Government have not so far seen their way to the Council being converted into a statutory body.

20. The Secretary of the Ministry of Scientific Research and Cultural Affairs while giving evidence before this Committee, expressed the view that at this stage of the building up of the organisation, if the CSIR were converted into a statutory body, an element of rigidity would be introduced in its working which would hamper its activities. He added that after the whole organisation got more experience and built up scientific work under the present flexible set-up, it could convert itself into a statutory body. The Committee do not share this apprehension. On the other hand such a step would place the organisation on a proper footing and enable it to function with well-defined authority. It may be pointed out that in U.K. the Council for Scientific and Industrial Research is a statutory body. They, therefore, recommend that the CSIR may be placed on a statutory footing.

#### **III. ADMINISTRATION**

#### A. Secretariat

21. The Director General, Scientific and Industrial Research is the principal executive officer of the Council. He is responsible for the day to day administration of the Council and co-ordinates and exercises general supervision over its technical and research activities including the work of the National Laboratories and research under the grants-in-aid scheme. He is a member of the Governing Body and its advisory bodies. He exercises powers similar to the powers of a Secretary to the Ministries of the Government of India. On the administrative side, in the Secretariat of the Council, the Director General is assisted by the Secretary who is in general overall chargeof the administration of the Council.

22. The sanctioned strength of officers and staff of the Secretariat of the Council is: Class I—53, Class II—131, Class III—251 and Class IV—127. The Council Secretariat has twenty sections and a Publications Directorate. The representative of the Ministry stated in his evidence before the Committee that the position in regard to the Secretariat staff of the Council was examined in 1956-57 in conjunction with the Ministry of Finance and O & M Division and certain economies were effected. He added that though there had been considerable increase in the duties of the Council since 1957, the quantum of staff had not been increased except in some technical divisions. He further informed the Committee that it was proposed to undertake a fresh job analysis after a year or so.

23. The Committee find that the Pool Section which deals with the "Pool of Scientists" for the placement of well qualified Indian scientists and technologists returning from abroad in suitable organisations in the country consists only of 1 Section Officer, 1 Assistant, 2 Upper Division Clerks and 2 Lower Division Clerks. Though the initial strength of the pool was fixed at 100, it turns out that not more than a dozen and a half have joined the pool out of 119 to whom the offers were made. Neither the strength of the Section nor its work appears to justify its existence as a separate section. The Committee, therefore, suggest that the question of merging the Pool Section with the "National Register Unit" and thereby effecting economy in staff may be examined.

24. The Committee note that the normal pattern of provision of Class IV staff for the Sections is 1 daftri and 1 peon per Section, which is excessive. The Committee recommend that the strength of Class IV staff may be reduced by adjustment on the basis of 1 daftri

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and 1 peon for two Sections to begin with. The Committee are strongly of the view that the general tendency on the part of various Ministries and Departments to engage a large number of Class IV staff especially of an unproductive character should be discouraged and recommend that the total number of Class IV staff for various Sections in a Secretariat organisation should not exceed the limit of one per Section.

25. The Committee were informed that the question of bringing Publications Directorate, INSDOC, NPL—INSDOC Library and the Information Service under one wing as recommended by Dr. K. S. Krishnan in his Report to the Council, as early as in 1955, was still under examination. The Committee are of the view that the amalgamation is bound to be advantageous both from the point of view of economy and efficiency, and accordingly recommend that a decision on the question may be expedited.

# **B.** National Laboratories

#### (a) Executive Councils

26. Executive Councils have been constituted for most of the National Laboratories. They are responsible for the control and general direction of the Laboratories within the frame-work of the rules and regulations and directions issued from time to time by the Governing Body. An Executive Council consists of experts in science and industry in the related field, who are nominated by the Governing Body of the CSIR. The Director General, Scientific & Industrial Research or his nominee, the Director of the National Laboratory concerned and the Financial Adviser to the CSIR or his nominee are ex officio members. The strength of an Executive Council is normally The Committee were informed that roughly one-third of the total 15. number of members of an Executive Council was represented bv industry. One-third of the membership of the Executive Council, excepting the ex officio members, retire at the end of each year. For its efficient functioning, the Executive Council is empowered to constitute (i) a Scientific Sub-Committee, (ii) Finance and Building Sub-Committee and (iii) Staff Sub-Committee, with such membership as considered necessary in each case either from amongst its own members or from outside. The Executive Council generally meets twice a year.

#### (b) Directors

27. The direction of scientific research and the day to day administration of the National Laboratories are vested in the Directors of the respective Laboratories who have been delegated certain administrative and financial powers. At the same time, in order to relieve the Director as much as possible of the routine administrative work and enable him to devote his attention to the directional and co-ordination aspects of the research programme some powers have been delegated to the Deputy Director, Assistant Directors and Administrative Officer. The Committee were informed that through working arrangements and convention, Directors had been able to entrust much of their routine work to the administrative officers. The Committee consider that this is a step in the right direction.

28. The Director of a National Laboratory has the powers to sanction expenditure of a non-recurring nature on purchase of stores, tools, equipment and plant upto Rs. 10,000|- and on construction and maintenance works upto Rs. 5,000|- in each case. It was brought to the notice of a Study Group of the Committee during the course of their visit to a National Laboratory that these powers were inadequate and should be enhanced to Rs. 50,000|- in each case. The Committee note that the Executive Council has adequate powers of sanction in these matters. It was stated that the question of increasing the powers of sanction of the Directors in regard to construction and maintenance works from Rs. 5,000 to Rs. 10,000 was under consideration. The Committee suggest that the powers of the Directors to sanction expenditure on purchase of tools and apparatus and on construction and maintenance works may be reviewed and suitably modified.

#### (c) Staff

29. A statement showing the total sanctioned strength, strength of scientific and technical staff with percentage to total sanctioned strength, strength of non-technical administrative staff with percentage to total sanctioned strength, percentage of permanent staff and percentage of temporary staff in respect of the National Laboratories is given in Appendix II. These figures indicate that the percentage of non-technical administrative staff to total sanctioned strength fluctuates widely from Laboratory to Laboratory. The Committee suggest that reasons for these wide fluctuations may be analysed in detail and steps taken to reduce this percentage.

#### (d) Recruitment

30. The method of recruitment and selection is given in bye-laws 57-73 of the Council of Scientific and Industrial Research. It has been provided that all posts under the Council shall be advertised on all-India basis, except for the lower categories of the Class III and Class IV posts which may be advertised locally. The names of news-papers in which advertisements for recruitment in respect of all-India posts are published are as under:---

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#### Calcutta

- 1. The Amrit Bazar Patrika.
- 2. The Hindustan Standard.
- 3. The Statesman.

#### New Delhi

- 1. The Hindustan Times.
- 2. The Indian Express.
- 3. The Statesman.

**Bombay** 

1. The Times of India.

2. The Indian Express.

Allahabad.

The Leader

Lucknow

The National Herald.

Ambala

The Tribune.

Madras

The Hindu.

The Committee suggest that the selection of newspapers should be more broad based than at present so that all the areas are adequately served, and if possible, every State could be served at least by one of the local papers.

#### (e) Shortage of Scientific and Technical Personnel

31. Details of the vacant scientific posts in the National Laboratories are given in Appendix III. The Committee were informed that many of these vacancies might be for a short duration due to the vacation of the posts consequent on promotion or otherwise; some of the vacant posts might have been recently created which would be filled up in due course when the normal process of recruitment was completed. Apart from posts which came under these categories, some shortage of scientific and technical staff was felt in general at various levels. It was explained that the shortage could be attributed mainly to the rapid development of the country under the five year plans, due to which demand for qualified and trained scientific and technical personnel both in the public and private sectors had gone up. Besides, in certain specialised fields like Design and Mechanical Engineering, Chemical Engineering, Metallurgy, Ceramics etc., adequate number of the trained research personnel were difficult to get. It was stated that one of the methods which had been adopted by the Laboratories to overcome this deficiency was to select competent young scientists and give them suitable training so that they could occupy senior positions in due course. It was further stated that advantage had also been taken by the Laboratories under the foreign aid programme to send their scientific staff abroad for training in specialised fields. Asked whether the shortage of qualified staff in the National Laboratories could be ascribed to the scales of pay obtaining in these Laboratories, the representative of the Ministry stated that earlier the scales had been somewhat of an impediment but now the scales had been improved. As a result, the shortages during 1956-57 were gradually coming down and they were getting better response to their advertisements.

32. The Committee learnt that there had been as many as 62 resignations in higher grades (the minimum of which was not less than Rs. 275|-) in the National Laboratories during the last three years. It was stated that in most cases, the officers resigned for better prospects. Some of the industries paid more than double the salary that they got in the Laboratory and naturally the persons were attracted. It was largely the industries in the public sector to which they were attracted. The Committee were relieved to note that the majority of those who resigned and went out were junior men and that the work in the research institutions did not suffer in consequence. The Committee would, however, like to see that the new entrants looked more for prospects within the Laboratories than outside.

#### (f) Incentives for Research work

33. The Committee were informed that some of the important incentives provided by the Council to the scientific staff of the National Laboratories were as under:—

- (1) Pay Scales: The scales of pay of the various categories of scientific staff in the National Laboratories Institutes are comparable to the scales prescribed for similar posts in the Government of India.
- (2) Special Merit Promotions: Special 'Merit' Promotions to officers of outstanding merit by the creation of supernumerary posts to be governed by special rules and regulations have been provided.
- (3) Sanction of advance increment: Advance increments upto a maximum of three can be granted to scientific personnel for exceptional originality.
- (4) Facilities for patenting inventions: Facilities are offered to the research workers to patent their inventions.
- (5) Freedom for publishing papers: Freedom to publish the results of research work in the Journal of their choice given after the subject matter is approved by the competent authority.
- (6) Sharing of royalties and premia: 30 per cent of the 70 per cent of the total receipts on account of premia and royalties accruing from the exploitation of a process developed at a National Laboratory and leased out to Industry was paid to the research workers.

34. The Committee have noticed with satisfaction the earnestness and devotion that characterise the work of the various research institutions and some of the results that have attended their labours. The Committee are not oblivious of the fact that research work cannot be judged only by the immediate results. Yet withal, it cannot be said that the results are wholly commensurate with the financial outlay on the institutions. As some complaints were heard with regard to some of the National Laboratories about lack of proper atmosphere conducive to scientific development and research activities, the Committee discussed this matter with the representative of the Ministry. They were glad to be assured by him that there was no real basis for such complaints. All the same, the Committee would like to stress that greater efforts should be made to foster a true spirit of research, which would secure to the country its proper place in the scientific world within a measurable period of time. The industrial establish-ments in India, barring a notable few, have not shown the same interest in research as their counterparts in other countries have done. In such circumstances, the need for National Laboratories to secure to research its proper place and role in national development is ever so much greater. The extent to which they inspire a feeling of confidence among the scientific world in providing a proper climate for research is a measure of their utility.

#### (g) Refresher Courses

35. The Committee understand that only a few National Laboratories Institutes organise refresher courses specialised courses for their staff and persons sponsored by industries and educational institutions and that even these courses are not held on any regular basis. The representative of the Ministry informed the Committee that these were innovations which had been introduced during the last couple of years. The Committee consider that greater attention should be paid to the provision of such facilities in the National Laboratories and that such courses should be held on a regular and systematic basis in order to

courses should be held on a regular and systematic basis in order to keep the members of staff and men from industry abreast of the latest developments and techniques.

#### (h) Training of Class IV staff

36. The Committee regret that there is no plan or programme for imparting training to qualified Class IV staff in the National Laboratories to enable them to be considered for higher categories of posts. The representative of the Ministry agreed that such training would be desirable. The Committee recommend that the National Laboratories should have a planned training programme for their Class IV staff. They also suggest that the question of reserving a certain percentage of posts in Class III, to be filled up in suitable cases by promotion from Class IV staff when they come up to the requisite standard should be sympathetically considered.

#### (i) Pensionary Benefits

37. A Contributory Provident Fund is maintained by the CSIR to which the staff are admitted. Each member of the staff has to subscribe to the fund at the rate of 81|3 per cent of pay including Dearness pay or more but the employer's contribution is limited to 81|3 per cent of the above. The Committee suggest that the question of

providing pensionary benefits as an alternate (optional) scheme for contributory provident fund for its employees may be considered by the Council.

(j) Amenities

#### (i) Housing

38. The Committee regret to observe that a very small percentage of staff in the National Laboratories has been provided with official staff quarters. The Committee were informed that the total requirements of housing for the staff of the National Laboratories were to the tune of Rs. 4 crores. As against this, a sum of Rs. 2 crores had been allotted during the Second Plan period. The work of construction was entrusted to the C.P.W.D. As the progress of work was slow it was decided in March, 1958 by the Governing Body of the Council that 50 per cent of the work would be executed by the Council, the remaining 50 per cent by the C.P.W.D. The representative of the Ministry informed the Committee that the Council had spent about Rs. 48 lakhs on the construction of staff quarters but the C.P.W.D. was hardly halfway towards it. Further, as a result of the experience gained it had now been decided that the entire work of Further, as a result of the construction would be taken over by the CSIR from next year. The Committee consider it unfortunate that there has been slow progress of work which was entrusted to the C.P.W.D. Now that the CSIR has assumed the responsibility for carrying out the entire work of construction itself, the Commmittee trust that no efforts would be spared to see that the targets laid down under the housing programme during the Second Plan are achieved. The Committee also suggest that adequate provision for housing should be included in the Third Plan. The Committee also suggest that the houses for different categories of staff should not be built in separate blocks or areas; but they should be suitably interspersedd with common facilities such as dispensaries. libraries, recreation centres, etc. Such a dovetiling has the added advantage of discouraging class consciousness.

#### (ii) Other facilities

39. The Committee were glad to learn that transport facilities were provided to the staff where a Laboratory was situated in out of the way places and charges recovered from the staff on "No profit No loss basis". The Committee were also informed that generally the following amenitities were also provided:—

- (a) Canteens
- (b) Co-operative Stores

(c) Recreation Clubs

(d) Medical facilities.

# (k) Scheduled Castes and Scheduled Tribes Employees

40. The Committee were informed that Government orders regarding reservation of posts for Scheduled Castes and Scheduled Tribes were made applicable to the CSIR in March, 1958. It was stated that certain categories of posts had been excluded from the purview of these orders but in the case of all other posts, reservation for Scheduled Castes and Scheduled Tribes was made as provided in these orders The list of posts thus excluded is enclosed as Appendix IV. The Committee realise that where technical or scientific knowledge is called for, considerations other than pure merit can have no room. A statement showing the representation of Scheduled Castes and Scheduled Tribes employees vis-a-vis total number of employees in Class I, Class II, Class III and Class IV posts in the National Laboratories as on 1st January, 1959, is given at Appendix V. These figures show that the representation of Scheduled Castes and Scheduled Tribes employees vis-a-vis the total number of employees in the National Laboratories is extremely small. There is no officer from these communities in Class I and Class II posts. The representation in Class III posts also is not very satisfactory. The Committee suggest that the reasons for their poor representation in the various categories of posts under the CSIR may be analysed so that suitable steps can be taken to improve the position without affecting the efficiency adversely.

#### (1) Administrative Expenditure

41. A statement showing the percentage of expenditure on administration in relation to the total expenditure of each National Laboratory Institute is given in Appendix VI. It is observed that the percentage of expenditure on administration in relation to the total expenditure of the majority of the National Laboratories is more than 10% which appears to be on the high side. It will be seen that in some cases (e.g. N.P.L., C.R.R.I, CEERI, Indian Institute for Biochemistry and Experimental Medicine and Birla Industrial and Technological Museum, Calcutta), there are appreciable fluctuations in the percentage expenditure on administration. The Committee suggest that the reasons for the fluctuations in administrative expenditure and its high rate should be carefully analysed and necessary measures taken to reduce the percentage expenditure on administration. They also suggest that the feasibility of fixing a suitable maximum limit to this percentage may be examined in consultation with the Ministry of Finance.

# (a) Central Grants-in-aid

42. The activities of the CSIR are financed mainly by annual grants from the Central Government. The table below gives the grants made by the Central Government since 1942-43:—

(In lakhs of rupees)

							Govern- ment giants
1942-43			•		•		11.000*
1943-44			•		.•		10.000
1944-45	•			•		•	25.000
1945-46							25.000
1946-47				•	•		51.610
1947-48	•	•		•			60·360
1948-49							62.920
1949-50							108.144
1950-51		•	•				150.000
1951-52	•	•		•			187.400
1952-53		•	•				202.048
1052-54	-	-					182 189
1054-55				:			178.925
1055-56			• •				213.500
1955-57							281.400
1057-58							270.000
1058-50							440.000
1950-60							535.000
1959 00			-				(till date)

#### (b) Donations

43. The CSIR has also received support from State Governments, private industrialists and other individual patrons of scientific research. Two statements showing cash donations and gifts of land and buildings made to the Council by them (excluding those of State Governments and the Coal Board) are placed at Appendices VII and VIII. The cash donations amount to Rs. 57.54 lakhs and the land donations are of the estimated value of Rs. 15.50 lakhs. While the Committee note that some donations have been received by the CSIR, they feel that for a big country like ours the response of the industry has not been encouraging and suggest that suitable steps be taken to promote the idea of the complementary roles of research and industry and the consequential benefits accruing to the latter. In this connection, it is seen that the Rules governing the constitution of the CSIR provide for the appointment of a donor of a sum of not less than Rs. 5 lakhs or a nominee of a firm which has donated a sum of not less than Rs. 25 lakhs as a member of its governing body. So far no firm or institution has donated a sum of Rs. 25 lakhs or more and only two individuals have donated a sum exceeding Rs. 5 lakhs each, one of whom is no more,

<sup>\*</sup>Including of Rs. 1 lakh for specific problems.

with the result that there is only one individual appointed as a member of the Governing Body, under this Rule.

(c) Miscellaneous Grants and Receipts

44. The CSIR also receives grants from various sources for specified purposes e.g. Department of Atomic Energy, Indian Central Oil Seeds Committee, Indian Lac Cess Committee. Among other sources of income to the Council may be mentioned, fees received by the National Laboratories for analytical work and technical advice, sale of publications and periodicals and royalties and premia for rights to exploit Council's patents and processes.

#### (d) Estimates for 1959-60

45. The Estimates of expenditure of the CSIR (including the National Laboratories and other constituent units) for 1959-60 and the corresponding grants-in-aid as agreed to by the Government of India are Rs. 581.780 lakhs and Rs. 545.000 lakhs respectively made up as follows:—

		(Rs. in lakhs)
	N	Estimates Sanctioned grants-in-
Recurring . Capital .		366 · 780 345 · 000 158 · 140
Pilot Plant		66·860
Total		591.780 545.000

(N. B. The different in the sanctioned estimates and the sanctioned grants-in-aid is made up of other receipts referred to in para 44.)

#### (e) Shortfalls in Expenditure

46. The following table gives the sanctioned estimates, the finally modified grants and actual expenditure of the CSIR (including National Laboratories and other constituent units) for 1956-57, 1957-58 and 1958-59:---

(Rs. in lakhs)

	Sanc- tioned Estimates	Finally modified grants	Actual Expen- diture	Varia- tions between Cols. 1 & 3	Varia- tions between Cols. 2 & 3
	I	2	3	4	5
Recurring . Capitat . Pilot Plant	237.000 106.410 60.000	231 · <b>93</b> 0 61 · 162 15 · 968	1956-57 221 · 706 44 · 700 13 · 880	15·294 61·710 46·120	10·224 16·462 2.088
Total	. <b>403</b> ·410	309.060	280.286	- I23·I24	

	_					
		I	2	3	4	5
		 		1957-58		
Recurring		267 • 420	250.000	251 · 540	-·15·880	+1.540
Capital		74.200	87.141	79·3£7	4 5 • 187	- ·7·754
Pilot Plant	•	<b>69·4</b> -0	18-(55	24.471	- 44 • 969	- 4 224
	TOTAL	411.060	365.836	355.398	55.662	10.438
				1958-59		
Recurring		319.746	331.023	324.692	+4.946	- 6.331
Capital		128 · 582	93 • 526	69 • 124	- 59.458	24 . 402
Pilot Plant		61.612	47.958	42·026		5-932
	Total	 509.943	471.507	435.842	- 74.101	- •36 665

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The Committee observe that against the sanctioned estimates for 1956-57, 1957-58 and 1958-59, there have been shortfalls in expenditure to the tune of 30.5 per cent, 13.5 per cent and 14.5 per cent. It was stated in evidence that the shortfalls were mainly due to:—

- (i) foreign exchange restrictions due to which a large proportion of equipment required for Laboratory work and pilot plant work could not be procured;
- (ii) non-availability of suitable staff to fill sanctioned vacancies;
- (iii) delay in construction of buildings; and
- (iv) cumbrous procedures in getting sanctions etc.

Whatever may be justified on the gound of restrictions in foreign exchange, the other reasons seem to be of a chronic character and could well have been kept in view in preparing the estimates. If that had been done, there would have been less of overbudgeting and less of shortfall. The Committee recommend that suitable measures should be taken to avoid such shortfalls in future.

#### (f) Foreign Exchange

47. The Committee note that 66.8%, 43.2% and 26.1% of the foreign exchange requirements of the National Laboratories/Institutes for the purchase of plant, machinery and equipment etc. were sanctioned during 1956-57, 1957-58 and 1958-59 respectively. They were informed that the reduction in the supply of foreign exchange delayed in certain cases the procurement of essential items of machinery and equipment and some accessories and replacements which resulted either in postponement of some problems or temporary stoppage of experimental work. In some cases, the tempo of work had

to be slowed down and in some, reorientation of the research programmes had to be resorted to. On enquiry, the Committee learnt that the National Laboratories had not been able to utilise in full even the foreign exchange allotment sanctioned to them, due to delay in receipt of sanctions from the Ministry of Finance for each individual item against the sanctioned quota according to the procedure. That procedure, it was stated, had recently been simplified and according to the present procedure, once the quota was sanctioned, there was no need for the National Laboratories to apply to the Ministry of S.R. & C.A. for formal releases of foreign exchange for each individual item and that such releases of foreign exchange against the allotted amounts would be done by the CSIR itself in concurrence with the Financial Adviser to CSIR. The Committee hope that under the revised procedure there will not be much time lag between the actual allotment of foreign exchange quota by the Ministry of Finance and its proper utilisation by the Laboratories.

#### **IV. RESEARCH SCHEMES**

#### A. Scope and nature of research undertaken

48. Research work under the Council is carried on in its own laboratories, and extramurally in Universities and elsewhere under the grants-in-aid scheme. The research work undertaken by the Laboratory is mainly aimed at the rapid industrial development of the coun-The Laboratories of the Council cater to the different interests try. and the nature of work undertaken by them, whether it is fundamental or basic or applied, can broadly be determined from the subject of their specialisation. For instance, the National Physical Laboratory, New Delhi and the National Chemical Laboratory. Poona undertake general and specific research directed to industrial needs. The other Laboratories deal with subjects of an applied character, such as metallurgy, leather, drugs, glass, electro-chemistry, electronics, and salt. In the course of their investigations, they have to undertake certain fundamental work as well. Laboratories like Fuel. Food. Building and Road are concerned with the proper utilisation of raw materials and the resources available in the country. In the field of engineering where much research work has not been undertaken so far, the Council has set up Laboratories, such as the Central Mechanical Engineering Research Institute, Durgapur, and Central Public Health Engineering Research Institute, Nagpur. The nature of research work undertaken in these Laboratories will be both fundamental and applied. Besides, Regional Research Laboratories have also been set up by the Council for exploiting the natural resources of the regions in which they have been set up.

To a great extent, the scope of research undertaken by the Universities is limited to fundamental work, where the objective is normally acquisition of knowledge and training of personnel. One notable difference between the work done in the National Laboratories and Universities is the further step usually taken by the former of carrying out pilot plant experiments of successful laboratory trials in order to make the researches of immediate practical benefit to users. This is naturally not attempted in Universities.

As far as other Research Institutes are concerned, fundamental work and applied research are undertaken in some specialised fields.

#### **B.** Programme Planning

49. The Executive Council, in particular the Scientific sub-Committee of the Executive Council—is responsible for guiding the research programme of a National Laboratory/Institute, the actual plan of programme being drawn up by the Director in consultation with the heads of divisions etc. in the laboratory. The Committee were informed that the Directors and other scientific workers in the Laboratories were associated with technical Committees set up by the various organisations and Ministries of the Government of India and of the State Governments and were in constant touch with the problems handled by them. They were also in touch with the private industry directly and through the Liaison Officers of the Council. It was also stated that the Laboratories/Institutes from time to time held symposia on subjects of topical interest, seminars and conferences and also discussions with industry and these enabled the research workers in the Laboratory to maintain contacts with their counterparts in the Universities, industries and other research bodies. The senior workers in the Laboratories were also deputed to attend international conferences and congresses in order to enable them to keep abreast of the developments taking place in the foreign countries. On major problems, discussions were also held with the Planning Commission and the Ministries of the Government of India before they were undertaken. It was stated that the cumulative effect of all such discussions resulted in preparing a planned programme of research for the Laboratory.

50. A view was, however, expressed before the Committee by the representative of the Ahmedabad Textile Industry's Research Association that the research programmes of the CSIR had not been related to the needs of the country. While agreeing that there was not much of systematic planning in the past, the representative of the Ministry expressed the view that now there was complete planning in each Laboratory and all projects which were now undertaken had some relation to their ultimate utilisation. The Committee would like to suggest that the CSIR should endeavour to dispel any misgivings in the minds of the industry in this regard and should associate the industry as closely as possible with research projects at all stages and thus create a feeling of belongingness of the National Laboratories/Institutes in the minds of the industry.

51. The Committee understand that there is no formal joint planning of programmes by the CSIR with the Defence Science Organisation but that the Ministry of Defence are represented on the various Executive Councils of the National Laboratories/Institutes, and the suggestions given by their representatives are taken into consideration while preparing the research programme of the Labora-The Director General. Scientific and Industrial Research is tories. a member of the Defence Science Committee. The Defence Science Organisation also holds annual conferences, group discussions and symposia at which the Directors and other research officers of the Laboratories are invited to participate. Besides, the Defence Science Organisation refers to the National Laboratories specific problems for investigation and advice. It appears to the Committee that while the knowledge and opinion of the Defence Science Organisation are available to the CSIR at the stage of planning of research programme of the Council with a view to avoiding overlapping, the complementary process does not take place to the extent it may be desirable. The Committee believe that joint planning of programmes in matters of common interest would tend to a fuller and better use of national resources and, therefore, recommend that the feasibility of joint planning of programmes by the CSIR and the Defence Science Organisanon may be examined by Government.

#### C. Co-ordination of Research Schemes

52. During the course of evidence, the Committee were informed by the representative of the Ministry that co-ordination was being maintained among the various National Laboratories in respect of the research work conducted by them through—

- (a) the Director General to whom all research projects were referred;
- (b) the Board of Scientific and Industrial Research; and
- (c) meetings of the Directors of the National Laboratories which were held once or sometimes twice a year, when individual and collective programmes were discussed.

The Research Committees of the CSIR co-ordinated research schemes financed by the CSIR under the grants-in-aid scheme. It was explained that there was also constant exchange of ideas between the National Laboratories and other research institutions. This was effected by various means such as the exchange of visits between the research workers of the National Laboratories and their counterparts in other research institutions, presence of research workers of the research institutions on the Research Committees and other scientific bodies of the CSIR, symposia etc. The Committee, however, find that preliminary investigations on Ceramics suitable for Nuclear Power had been taken up at the Central Glass & Ceramic Resarch Institute but that this work was not continued further on learning that the Atomic Energy Department had already interested itself in a detailed study of the subject. This instance seems to indicate that there was not sufficient co-ordination between the Atomic Energy Department and the CSIR in research activities. The Committee cannot overstress the need for closer co-ordination in research work between the National Laboratories and other Research Institutions in the country with a view to avoiding unnecessary duplication and waste of research efforts, and they, therefore, recommend that suitable measures should be taken to ensure maximum co-ordination in this direction.

#### D. Grants-in-aid for Sponsored Research

53. A note detailing the scope and procedure for giving grantsin-aid by the CSIR for schemes of sponsored research is given in Appendix IX. The table below gives the number of the research schemes sponsored by the CSIR, the number of centres in which investigations are being pursued and the grants annually made towards sponsored research since 1956-57:---

Year		Total No. of schemes sanctioned	No. of centres	Grants made
1956-57 1957-58 1958-59 1959-60	• • •	254 321 382 390	61 74 82 82	13 · 385 20 · 603 26 · 545 19 · 999*

The above figures indicate that though the number of schemes sanctioned during 1959-60 was more than in 1958-59, the number of centres remained the same during both the years. The Committee suggest that efforts should be made to sponsor more of such centres wherever conditions are favourable for research.

### E. Evaluation of Research Work

54. The Committee understand that periodical reviews of the work done by the National Laboratories Institutes are undertaken by the Scientific sub-committees and the Executive Councils of the concerned National Laboratories. Similarly, the Expert Research Committees review the progress of schemes carried out in Universities and outside institutions with the CSIR grants at least once a year. The representative of the Ministry informed the Committee that besides this kind of continuous review, an evaluation of the work done was also made by a Reviewing Committee after every five years. He stated that it was proposed to undertake a fresh review of the work of the Council in 1961. He added that no thought had yet been given to the composition of the proposed Reviewing Committee but whosoever happened to head the Committee would not be the one associated with any of the National Laboratories. The Committee suggest that the proposed Reviewing Committee should consist of eminent men from science and industry including one or two outstanding scientists from abroad. The Committee also consider that it would be profitable to have the same Reviewing Committee or an equally high powered Committee to scrutinise research programmes formulated for the Third Five Year Plan.

55. In connection with the evaluation of the work done so far, the Committee were glad to learn that many of the results of research carried out in the National Laboratories Institutes and under spon-

<sup>\*</sup>Bills for the second half are still await.d.

sored research projects had received international recognition in some form or the other. A few instances of such recognition furnished to the Committee are given in Appendix X. The Committee will be dealing with some of the results achieved in a subsequent report.

#### F. Collaboration with Universities

56. The Committee were informed that the CSIR had maintained close collaboration with the Universities in the training of personnel through the media of exchange of visits between scientists working in the Universities and in the National Laboratories and through symposia, seminars, colloquia, lectures and discussions. Besides, many Universities have recognised experts in the National Laboratories as suitable guides to guide research leading to Ph.D. and higher qualifications. The Council has also taken steps to augment the research facilities in the Universities by the award of suitable grants-in-aid on three years five years basis and also to build up schools of research. The Committee, however, learnt that only 16 professors from Universities including one from foreign University came to work in the National Laboratories during the last three years and the period of work in a majority of cases was less than three months. They further learnt that no research workers from the National Laboratories had been sent to the Universities as regular professors The Committee consider that interchange of staff between the National Laboratories and the Universities as also between the National Laboratories and allied technical departments of Government and Public Undertakings for certain specified periods may be of use from several aspects and. therefore, recommend that the feasibility of this proposal may he examined.

57. The Committee find that no serious attempt has been made to evaluate the benefit derived by research workers who come from Universities for doing work in the National Laboratories. The Committee consider that it is important that all research workers from Universities or other educational institutions who come to Laboratories should be given a full programme of wo k and that it should be ensured that they derive full benefit from such association.

58. The Committee understand that the Inter-University Board adopted a resolution in 1953 to the effect that the National Laboratories under the CSIR be recognised as Institutions for research beyond the post-graduate stage by different Universities. This resolution was reiterated in their meeting held in 1956. A list showing the names of National Laboratories Institutes which have been recognised by different Universities for research is given in Appendix XI. It will be seen from the list that while some of the National Laboratories Institutes have been recognised by a few Universities, others have been recognised by a larger number of Universities. The Committee see no reason why there should be such a diversity in this respect. They consider that the question of recognition of National Laboratories Institutes by the various Universities for research work needs further attention and suggest that necessary steps may be taken to bring about greater uniformity in this matter as early as possible.

The Committee further consider that the extent and scope of collaboration between the National Laboratories and the Universities need to be expanded very considerably.

#### G. Fellowships

59. In order to train a large number of research and scientific personnel required not only for the National Laboratories but also for other institutions in the country and the universities, the CSIR has instituted a scheme of junior and senior research fellowships tenable both at the National Laboratories and in other Institutions and University Laboratories. Junior research fellowships are awarded to holders of Master's degree in Science or Bachelor's degree in technology or engineering or equivalent qualifications, who are qualified to benefit from full time training in methods of scientific research. Senior research fellowships are intended for young research workers who have completed the normal course of post-graduate training in methods of research and who have proved that they have exceptional aptitude for original and independent research and promise of becoming leaders of scientific thought, provided that they are given an opportunity of developing their particular aptitude. The value of these fellowships is Rs. 250 p.m. for junior research fellowships (Rs. 300 in specialised subjects) and Rs. 400 p.m. for Senior Research Fellowships (Rs. 500 in specialised subjects). The normal period for these fellowships is two years with possible extension to three years.

60. The following table shows the sanctioned estimates, finally modified grant and actual expenditure under the budget head 'Fellow-ships and Scholarships' during the last three years:—

Yea	ır		Sanctioned estimates	Finally mocified grants	Actual expenditure	Variations between Cols. 2 & 4	Variations hetween Cols. 3 & 4
	I		2	3	4	5	6
1956-57 1957-58 1958-59		•	Rs. 60,000 7,50,000 5 50,000	Rs. 20,000 65 000 2,00,000	Rs. 17,000 65,000 1,70.900	Rs. ()13,000 () 85,000 ()3,59.100	Rs. ()3.000 ()9,100

There are wide variations between the budgeted estimates and actual expenditure. Evidently it was very much of an over estimate. Some suggestion was made that enough qualified candidates were not coming forward to take advantage of these scholarships. The Committee find it rather difficult to accept such a plea. The Committee suggest that the reasons for the non-utilisation of funds under "Fellowships and Scholarships" should be investigated without delay and vigorous steps taken to ensure that the funds allotted under this head are utilised in full in future so that a number of scientific and technological workers both within and outside the Laboratories are able to take advantage of the scheme.

61. A statement showing the number of research fellowships awarded in each of the National Laboratories Institutes by the CSIR since 1956-57, year-wise, is placed at Appendix XII. The table below gives the number of research fellowships awarded by the Council under approved research schemes to various Institutions Universities since 1956-57, year-wise:—

Year	Senior research fellowsh <sup>*</sup> p	Junior research fellowship
1956-57	••	3
1957-58	19	42
1958-59	21	47
1959-60	32	49

62. The Committee were informed that follow-up was kept of the Research Fellows in that their names were registered in the National Register of Scientific and Technical Personnel and that information was obtained periodically from them as to where they were employed. On enquiry, the Committee learnt that there had been a few instances where research fellows discontinued research before the expiry of the period of the award. The Committee consider that this practice is undesirable and that it should be discouraged. They consider that it is desirable to provide for a suitable penalty to be paid by the recipient of the award who leaves before the expiry of the period of award.

# **V. PATENTS, RESEARCH DEVELOPMENT AND UTILISATION**

#### A. Patents

63. Most of the successful research work done in the National Laboratories of the CSIR is patented as new inventions. The Council itself is responsible for the patenting of its inventions and the renewal of its patents. The following table gives the number of patent applications filed by the Council during the period 1951-52 to 1959-60 (upto 27.8.1959):---

 Yar	·····		<b>.</b>					Number	
I <sub>2</sub> 51-52	•	•	•			•		•	41
195 <b>2-53</b>	•	•		•	•	•	•	•	35
1953 54	•	•	•	• •		•		•	46
1934-55	•			•	•	•	•	•	58
1955-56	•	•	•		•	•	•	•	52
<b>19</b> 5 <b>6-5</b> 7	•	•	•	•	•	•	•	•	68
1957- <b>5</b> 8	•	•	•	•		•		•	57
1958-59		•	•	•	•	•	•	•	69
\$ 1959-60 (upto 27-8-59).				•	•	•	•	•	26
				Total	•	•	•		452

Patent applications filed-1951-52 to 1959-60 (up o 27-8-1959)

Out of these 452 patent applications, 316 (70 per cent) patents have been sealed; 24 (5 per cent) have been accepted but not sealed, 70 (16 per cent) patent applications are pending and 42 (9 per cent) have been abandoned. An analysis of research centres from which the pattentable inventions have originated shows that 393 (87 per cent) patents have come from the Council's Laboratories and 59 (13 per cent) from sponsored research. The number of patent applications filed in foreign countries during the period 1951-52 to 1959-60 (upto 27-8-1959) is 71, out of which 33 have been accepted.

#### **B.** Research Development and Utilisation

#### (a) Pilot Plants

64. The completion of Laboratory investigations of a scheme is only the first step leading to its commercial application. Before the results are actually translated into commercial exploitation, experimentation on a pilot plant is necessary in many cases with a view to obtaining technical data for assessment of the likely form the ultimate production unit is to take and guaging economic possibilities of the process. This step also provides preliminary data on the economic possibilities of the process.

The first Reviewing Committee recommended in their report that in order to make the researches of the Council of immediate practical benefit to industrialists, they should be carried out, as far as possible, to the pilot plant stage and for that purpose adequate provision should be made in the National Laboratories and elsewhere. In pursuance of this recommendation, a provision of rupees one crore for pilot plants in different Laboratories was made in the First Five Year Plan. The actual expenditure incurred against this provision, however, came to Rs. 4 452 lakhs only. This only shows how extremely unrealistic were the calculations.

65. The estimates and expenditure for Pilot Plants during each of the first three years of the Second Plan are as under:---

					(Rs. in 1 khs)				
Year	Year					Finally modified Grants	Actual Expendi- ture		
1956-57	•	•	•		60.000	15.968	13.880		
1957-58		•	•		<b>69</b> · <b>44</b> 0	28.695	24.471		
1958-59	•	•			61.612	47 958	42.026		
	Total		•	•	191 . 055	92.621	80.377		

The reasons for the shortfall are stated to be:---

- (i) non-completion of preliminary formalities for new works and projects;
- (ii) considerable delay in the receipt of equipment mostly from abroad; and
- (iii) non-receipt of shipping documents and bills from suppliers to the tune of Rs. 3 lakhs.

These reasons it will be seen do not explain the large shortfalls from the budgeted amounts. The Committee consider that it would be worthwhile to examine what have contributed to them and eliminate all the reasons responsible therefor since such shortfalls inevitably retard the development and commercial exploitation of the processes.

66. The Committee understand that 79 pilot plants have been set up in 11 National Laboratories so far. Of these, 52 are in operation, 9 are being installed and expected to start functioning shortly and 18 have closed down on completion of pilot plant trials. Besides field trials are being carried out on certain processes in the Central Building Research Institute. A Statement showing the particulars of the pilot plants is given, in Appendix XIII. Among the important processes
which are under investigation on pilot plants or on field scale in the National Laboratories may be mentioned (i) production of foam glass at the Central Glass & Ceramic Research Institute; (ii) High temperature carbonisation of coal and washing of coal at Central Fuel Research Institute; (iii) production of dairy salt at Central Salt Research Institute; (iv) manufacture of bricks from black cotton soil at Central Building Research Institute; (v) production of fat liquors and leather boards at Central Leather Research Institute; (vi) production of pig iron using non-coking coals at National Metallurgical Laboratory and (vii) production of synthetic rice and multipurpose food at the Central Food Technological Research Institute. Prominent among the pilot plants which are being installed are (i) pilot plant for production of optical glass at Central Glass & Ceramic Research Institute; (ii) low temperature carbonisation plant at Central Fuel Research Institute; (iii) pilot plant for production of refractories and pilot plant for conducting studies on benefication of low grade manganese, chromite and other ores at National Metallurgical Laboratory.

While on the subject of "Pilot Plants", the Committee would like to stress one point *viz.*, that the real function of a Research laboratory is to conduct research with a view to arriving at results which can be commercially exploited and which will bring economic benefit to the country. It is not its function to undertake production on a commercial scale. The scope of pilot plants should, therefore, be limited to testing the feasibility of extending, on a commercial scale, a process evolved in "the Laboratory. Normally once a process is found to be capable of commercial exploitation, it should be handed over to the N.R.D.C.

### (b) Processes released

67. After a process is developed to a stage when it is considered ripe for exploitation, it is passed on to the National Research Development Corporation for being leased out to industry for commercial explotation and/or for being developed by the National Research Development Corporation itself in case the industry is unable to take advantage of it in a reasonable period of time. Ordinarily, it is not the policy of the CSIR to undertake commercial production of articles. The general policy to be followed in this connection was considered by the Board of Scientific and Industrial Research and the Governing Body in March, 1959 and it was decided that in view of the necessity to save expenditure on foreign exchange and to initiate industrial production within the country of all articles, however limited their demand may be, the proposals such as the one put forward by the Central Glass & Ceramic Research Institute for production of certain ceramic articles for which there was only a small demand, should be taken up by the CSIR and given a trial.

68. The Committee understand that 196 processes developed by the Council's Laboratories and under its sponsored research schemes have so far been released to industry. Of these, 92 have been released against premium and royalty and 104 have been released free. Besides, 36 processes are ready for exploitation and are awaiting release to industry. A list of the processes released is given in Appendix XIV. Processes are generally leased out to industry on recurring royalties varying from 1 to  $5\frac{1}{0}$ . The Committee were informed that from the processes leased out to industry, a sum of Rs. 1.09 lakhs was received as premia and royalty during the period 1.4.1956 to 31.12.1958, and that there had been a saving in foreign exchange of about Rs. 45 to Rs. 50 lakhs per annum as a result of the successful utilisation of these processes during the last three years, and it had been estimated that the figure would go up to Rs. 1.5 crores at the end of 1960-61. In regard to the processes leased out free of cost, it was stated to be difficult to assess the benefit derived by the industries. In some cases, the National Laboratories themselves have undertaken production on pilot plants.

The National Physical Laboratory is producing on a pilot plant scale ceramic capacitors and supplying to the radio and electric lamp industries. The Central Leather Research Institute is producing fat liquors from fish oil and supplying to trade interests at cost.

69. The Committee note that the number of processes licensed out and in commercial production is 17. A list of such processes indicating also the year in which a particular process was released as also the year in which production started is given in Appendix XV.

The Committee find that there has been a time lag of 3 to 5 years between the release of the following processes to industry and their commercial exploitation:—

- (i) Manufacture of nicotine sulphate from tobacco and tobacco waste.
- (ii) Mica insulating bricks.
- (iii) Manufacture of Pristemerin and Dulcital.
- (iv) Production of carbon slab and rod material used for making brushes for electrical machinery.

It was explained by the representative of the Ministry that in some cases the time lag was partly due to the fact that the processes had been released prematurely with the result that they had to be returned for further trials. The Committee consider it rather unfortunate that the results should have been hurriedly released to the industry for sxploitation, for such a course would make entrepreneurs hesitant in taking up research results for commercial application. In this connection, the Committee were glad to learn from the representative of the Ministry that for the last three years, the processes had been tested before their release and they made sure that they were acceptable and economical. The Committee hope that this practice will be strictly adhered to.

70. The Committee were informed that many more processes leased out to the industry could have been taken to commercial exploitation but for the following bottlenecks:—

> (i) lack of proper pilot facilities at the National Laboratories with the result that industry was reluctant to take up the processes on the basis of Laboratory|semi-pilot results;

- (ii) difficulties experienced by the industry for procuring specialised equipment from abroad and fabrication of components indigenously;
- (iii) the present small internal demand for some products developed and hence the unwillingness of the industry concerned to take up production on account of economic considerations.

It was stated by the representative of the Ministry in his evidence before the Committee that most of such processes related to research results obtained three to four years ago when there was not much of systematic planning and the researches undertaken could hardly be termed as projects. He expressed the view that 50 per cent of the processes that had been released by the Council would not really have been commercially exploitable. It is regrettable that adequate attention and care had not been given to the planning and execution of the CSIR's research programmes and schemes prior to the last three years. The Committee recommend that concerted and effective measures should be taken to remove any bottlenecks that may still exist in the way of the commercial exploitation of the processes developed at the National Laboratories.

71. The Committee were informed that when commercial production of an article or material based on processes developed in the National Laboratories/Institutes was established, a request was made to the Development Wing of the Ministry of Commerce and Industry by the N.R.D.C. to restrict the import of the same. Thereupon the Ministry would consider the requirements of the country as well as the quality of the indigenous product, and then decide as to how far its import should be restricted. Besides, the matter would be raised whenever necessary in the various Development Councils of the Ministry of Commerce and Industry by the Directors of the National Laboratories/ Institutes who served as members of these Councils and at the meetings of the Joint Standing Committee for Scientific Research and Industry. The representative of the Ministry, however, stated in his evidence that foreign manufacturers had been licensed to manufacture projects like infant food or baby food and Vitamin 'C' even though processes for their production had been developed at the National Laboratories. The Committee would like to observe that if suitable processes have in fact been developed for the production of the above products by the National Laboratories, it is really a matter of concern that licenses for their manufacture should have been given to foreign manufacturers. The Committee suggest that the circumstances leading to the issue of licences in these cases should be investigated.

#### (c) Lack of interest on the part of the industry

72. The Committee were informed by the representative of the Ministry that industry had not evinced much interest in the results of the researches carried out by the CSIR and that there was a tendency on the part of industry to borrow the know-how from outside even though

the National Laboratories had been successful in evolving some solutions. This tendency was attributed to the fact that what emanated from the Laboratory even after a trial on pilot plant had certain difficulties and snags which the industry that took on such problems had to iron out. This the industry was averse to do because when it got some knowhow from outside, all such difficulties had already been ironed out by the foreign supplier. It was stated that even in the case of certain public sector industries such as chemical or pharmaceutical drugs industries, the CSIR experienced a little difficulty in securing application of processes evolved by it. The Committee consider it unfortunate that such processes as have been proved on a pilot plant scale to be economically suitable for commercial exploitation should remain unutilised. They are of the view that the solution to this problem lies in closer collaboration between the National Laboratories and industry which could be secured by associating the representatives of the industries concerned with the research projects and schemes at all stages. The Committee are also of the view that public sector industries should show greater willingness to utilise the processes developed at the National Laboratories and should give a lead to the private industries in this respect.

### **VI. RELATIONS WITH INDUSTRY**

### A. Joint Standing Committee for Scientific Research and Industry

73. The Joint Standing Committee for Scientific Research and Industry was constituted in 1956 with a view to maintaining close and effective co-ordination and liaison between the Development Wing of the Ministry of Commerce and Industry and the CSIR. The present composition of the Joint Standing Committee is as follows:—

Ι.	Sh i Manubhai Shan, Minister for Industries	6	•	•	Chairman
2.	D.G.S.I.R.		•	•	Member
3.	Dr. A. Nagaraja Rao, Chai. mar, Heavy Ird	lustries	S Corporatic	n	Member
4.	Lala Sh1i Ram, New Delhi .	•	•	•	Member
5.	Shri S. Anantharamakri Amalgamations Ltd., Madras.	shnan,			Member
6	Development Commissi	offer			

6. Development Commissioner, Small Scale Industries, Ministry of Commerce and Industry . Member

The Committee generally meets once or twice in a year. It was explained by the representative of the Ministry that the Joint Standing Committee sat to evaluate the projects which emanated from the National Laboratories/Institutes before they were passed on to the National Research Development Corporation or any other agency for exploitation. If the process was a patented one, it had of necessity to be submitted to the N.R.D.C. In the case of a non-patented project which would help a small industry and would contribute to national economy, the Director of the National Laboratory concerned was asked to get some small industry interested in the project. Besides, such matters as merited attention of the Ministry concerned from the point of view of better utilisation of natural resources, were discussed by the Committee and brought to the notice of the concerned Ministry. The representative of the Ministry stated that he was satisfied with the set up of the Committee except that he would like its membership to be strengthened. The Committee agree with the view and suggest that the strength of the Joint Standing Committee should be suitably augmented.

74. The Committee regret to note that there has been slow progress and not much of active follow-up action in regard to the recommendations made by the Joint Standing Committee in 1957 (Appendix XVI) relating to the following projects:—

- (1) manufacture of sulphur from gypsum and pyrites;
- (2) economic utilisation of bones for manufacture of fertilisers;
- (3) setting up of a plant for recovery of sodium sulphate from salt bitterns;
- (4) manufacture of table salt by open pan and vacuum evaporation by Salt Commissioner, Government of India.

The Committee consider it to be of vital importance that the recommendations of the Joint Standing Committee are followed up and implemented within the shortest possible time. They suggest that the progress in respect of the above items may be speeded up. They further suggest that the Joint Standing Committee should periodically review its previous recommendations and ensure that they are expeditiously implemented.

75. The Committee understand that in pursuance of the recommendations made by the Joint Standing Committee in December, 1957 and February, 1958, a scheme was evolved for giving financial and technical assistance to small scale inventors, small workers, artisans and technicians in order to infuse in them a spirit of enterprise and to encourage inventions, researches and ideas in their respective spheres. The scheme was entrusted to Small Inventions Development Board under the Ministry of Commerce and Industry. The Director General, Scientific and Industrial Research, is the Chairman of the Board. The Committee learnt with regret that little progress had been made in the matter beyond the formation of the Board. The Committee cannot but regard the position as extremely unsatisfactory. They recommend that immediate steps should be taken to energise the activities of the Small Inventions Development Board.

#### **B. Industrial Liaison Officers**

76. The CSIR has an Industrial Liaison Officer in the Central Office of the Council in New Delhi, another at Jaipur and three Regional Liaison Officers, one each at Calcutta, Bombay and Madras. The jurisdiction of each Liaison Officer is as follows:—

1. Regional Liaison Officer, Calcutta

States of Bihar, West Bengal, Orissa, Assam and Territories of Manipur and Tripura.

2. Regional Liaison Officer, Bombay. State of Bombay.

**.**...

3. Regional Liaison Officer, Madras States of Andhra, Madras, Kerala and Mysore. 4. Industrial Liaison Officer, Jaipur

States of Rajasthan, Punjab, Madhya Pradesh and Uttar Pradesh (excluding Delhi), J & K and Himachal Pradesh.

The Industrial Liaison Officer in the Central Office co-ordinates the work of other Liaison Officers and looks after the work in Delhi.

77. The Liaison Officers visit manufacturing establishments in their respective areas, contact industrial associations and Chambers of Commerce and provide a two-way traffic of consultation and advice between the industry and the National Laboratories/Institutes. One of the functions of the Liaison Officers is to carry out specific case studies. To start with, they have been carrying out such studies in relation to Chemical industry. They have also been collecting information in respect of raw materials and semi-manufactured goods which are imported and/or are in short supply. A statement showing the volume of work done, year-wise, by each of the Liaison Officers is given below:—

05.00	No. of Inc establishn tec	lustrial nents visi- l	No. of end problems and atte	quiries ascertained ended to	No. of or from inc exploitati Council's	ffers obtd. Sustries for on of processes
• *	July'57 to June' 58	July'58 to June' 59	July'57 to June' 58	July'58 to June'59	July'57 to June' 58	July'58 to June' 59
Regional Liaison Officer, Calcutta .	67	50	222	82	3	5
Regional Liaison Officer, Bombay.	27	33	15	12	17	20
Regional Liaison Officer, Madras .	83	129	55	34		2
Industrial Liaison Officer, Jaipur .	45	104	2—-3 (enquiries per day)	140 (Approx	.)	2

The Committee observe that the number of offers obtained from industries for exploitation of the Council's processes by the Liaison Officers except the Regional Liaison Officer, Bombay, is rather disappointing. They suggest that greater efforts should be made by the Liaison Officers to secure offers from industries for the utilisation of the Council's processes.

### C. Information Services and Documentation Centre

### (a) Scope for improvement

78. The dissemination of scientific and technical information is done both by the Publications Directorate of the CSIR and by the National Laboratories/Institutes. Work relating to the dissemination of scientific information falls into two categories. The first is concerned with information relating to researches carried out under the Council's auspices in the National Laboratories, research stations and units and sponsored research schemes; and the second is concerned with surveying world literature for scientific and technological development and making the information available to research workers, industry and other users of scientific information.

Results of research work done at the National Laboratories are disseminated among those interested through the following media:—

- (i) publication of bulletins and brochures, special memoirs, leaflets and feature articles, and research papers in periodicals in India and abroad;
- (ii) publicity in technical and trade journals and newspapers;
- (iii) circulation of non-technical notes on patents;
- (iv) symposia and seminars;
- (v) exhibitions and practical demonstrations;
- (vi) extension services;
- (vii) radio talks and film reels;
- (viii) Museum Sections set up in the Laboratories and facilities provided for visiting the Laboratories; and
  - (ix) liaison with industries and contacts with different organisations of the Government of India and State Governments etc.

79. A statement showing the volume of work done in the field of dissemination of scientific information by the National Laboratories is given in Appendix XVII. From this statement it is seen that only a few National Laboratories have adopted such methods as practical demonstrations, symposia, bulletins and radio talks, for the purpose. The Committee do not consider this to be satisfactory. They cannot over-emphasise the importance of ensuring that information on the results achieved by the National Laboratories reaches those to whom it would be of value. They, therefore, recommend that the various methods of dissemination of the research results should be made use of adequately in a well planned and co-ordinated manner.

### (b) Individual contacts

80. The Committee were given to understand that besides the Industrial Liaison officers of the CSIR who remained in contact with the industrialists, the Director General, Scientific and Industrial Research and Directors of the National Laboratories also met the industrialists individually. They were, however, informed by the representative of the Ministry during oral evidence that the efforts of all these

officers had not succeeded in evoking adequate response from industry. The Committee suggest that the reasons for the poor response from industry may be carefully analysed and assessed and positive steps taken to stimulate the interest of industry in the work of the National Laboratories.

81. The Committee were informed that the industrial staff of the CSIR analysed all the contacts made by it with the various industries. The Committee consider that it would be helpful if each National Laboratory also undertakes an analysis of all the contacts it has made with industry with a view to ascertaining how contacts are initiated as also the effectiveness or otherwise of the methods of contacts. In the light of such analysis, necessary action may be taken to remove any weaknesses that are noticed in the present system.

### (c) Publications

82. The following categories of publications are brought out by the CSIR and the National Laboratories:—

### **CSIR**

- (i) Periodicals;
- (ii) Encyclopaedias;
- (iii) Monographs;
- (iv) Surveys;
  - (v) Reports;
  - (vi) Symposia proceedings;
  - (vii) Bulletins;
  - (viii) Literature reviews; and
    - (ix) Brochures, folders and leaflets.

## National Laboratories

- (i) Monthly/Quarterly bulletins on specific branches of research.
- (ii) Special brochures describing the work and achievements of a particular laboratory/institute.
- (iii) Annual progress reports.
- (iv) Research papers and notes.

The Committee understand that no study has been made to evaluate the impact of the publications of the CSIR and the National Laboratories on industry. The Committee consider that it would be useful to have such a study made and they, therefore, recommend that necessary steps in this direction may be initiated. Besides, the CSIR and the National Laboratories should keep in touch with the recipients of their publications and gather their reactions. The Committee also suggest that the CSIR should bring out publications in English as well as regional languages giving scientific information in non-technical simple language which can be understood by a layman.

83. The Committee understand that even some of the well established National Laboratories like the National Chemical Laboratory and National Botonic Gardens are not publishing their Annual Reports. The Committee consider it desirable that all the National Laboratories should publish annual reports giving their activities for the year. The reports should be prepared in such a manner as to stimulate enquiries from industry.

84. The following table gives the percentage of receipts on account of the sale of publications published by the CSIR and the National Laboratories to the total investment on their respective publications for the year 1958-59:—

Percentage

39.65

10.75

129 · 1

7.0

9.0

22.0

6.52

132

21

•

(Publications are distributed fice)

The Committee observe that while the receipts of the C.G.C.R.I. and I.I.B.E.M. on account of sale of their publications are very satisfactory, inasmuch as they more than cover the expenditure incurred, the receipts of C.F.T.R.I., N.B.G., C.B.R.I. and N.M.L. are meagre. What has been possible in the case of the former two should be equally possible in the case of the rest. The Committee suggest that the reasons for poor receipts on this account in respect of the various National Laboratories other than C.G.C.R.I. and I.I.B.E.M. may be carefully investigated and suitable steps taken to step up the income from this source.

#### (d) Indian National Scientific Documentation Centre

I. Publications Directorate CSIR .

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2. C.F.T.R.I.

3. C.G.C.R.I.

4. N.B.G. .

5. C.F.R.I.

6. C.B.R.I.

7. C.R.R.I.

8. N.M.L.

10. C.L.R.I.

9. I.I.B.E.M.

85. The Indian National Scientific Documentation Centre was established in 1952 by the Government of India with the technical assistance of UNESCO for providing documentation facilities to scientists, research workers, scientific institutions, industrial organisations, engineers, doctors, etc. The organisation of this Centre has been entrusted to the Council of Scientific and Industrial Research which has placed it under the administrative control of the Director, National Physical Laboratory. The Centre is located in the premises of the National Physical Laboratory. In the beginning, the Centre was financed by the Government of India, Ministry of Natural Resources and Scientific Research. From April 1956 onwards, the Council of Scientific and Industrial Research provides the requisite finances for the functioning of INSDOC. The sanctioned estimates for 1959-60 are Rs. 5.250 lakhs. An Advisory Committee consisting of D.G.S.I.R. as Chairman and 9 other members has been constituted to advise on all matters concerning INSDOC.

86. The representative of the Ahmedabad Textile Industry's Research Association in his evidence before the Committee stated that the impact of the INSDOC had not been very satisfactory; he explained that sometimes the INSDOC took more than a year to furnish a translation into English of a scientific article in a foreign language. The representative of the Ministry, when questioned on this point, stated that because of the lack of translators with the INSDOC, sometimes delays occurred. He expressed the view that the INSDOC, which was at present working in a restricted way, needed to be considerably expanded. He informed the Committee that a proposal to expand its activities was under consideration. The Committee consider that there is considerable room for improvement in the working of the INSDOC and they, therefore, recommend that urgent steps should be taken to gear up its machinery, so as to ensure quick and efficient service, and to fulfil its avowed objectives.

### (e) Open Days

87. The Committee were informed that most of the National Laboratories held 'Open Days'. As regards the National Physical Laboratory, it was stated that it did not have any 'Open days' yet, but the Laboratory being situated in Delhi, almost every day was an 'Open day' during the winter season. The Committee would like to observe that the system of allowing visitors to come and see things for themselves any day as is the case in the National Physical Laboratory is not satisfactory as it is bound to disturb the work of the staff. The Committee consider that it would be better if the Laboratories hold 'Open days' for a specified number of days in a year when a very large cross-section of the concerned industry and others interested might be invited to visit the Laboratories and discuss matters with them. If, however, any one wishes to see the Laboratories on other days, he might be permitted to do so by the Director by a previous appointment. Such visits should be so arranged as to avoid any disturbance to research work carried on in the Laboratory.

### D. Extension Services

88. The Central Leather Research Institute, Central Food Technological Research Institute, Central Building Research Institute and Central Road Research Institute have been selected for extension work in the Community Development areas to start with. Out of these, the first two institutes have organised extension units. The Central Road Research Institute has not set up any regular extension service unit, but is carrying out Pilot Plant construction of stabilized soil roads in various parts of the country. Similarly, no separate extension cell or unit exists in Central Building Research Institute for this purpose, but staff working on other projects is helping with extension work.

The representative of the Ministry stated in his evidence that the Institutes mentioned above made arrangements to receive some of the officers of the Community Development Organisation for training under refresher courses, but the response had not been satisfactory, which the Committee are at a loss to understand. They suggest that the reasons for the lack of response from the Community Development Organisation may be investigated and remedial measures taken.

89. The Committee understand that the Central Food Technological Research Institute is handicapped in regard to extension work by the shortage of technically trained staff with requisite practical experience. They, therefore, recommend that prompt and vigorous steps should be taken to augment this service so as to ensure that the benefits of research reach the common man.

90. The Committee were informed that there was a shortage of technical people required for the extension service of the Central Leather Research Institute. The representative of the Ministry ascribed the shortage to the apathy on the part of the technically trained people to go to tanneries in the course of their work. The Committee recommend that suitable measures should be taken to attract persons for taking up work in the Extension Service of the Central Leather Research Institute.

### E. Technical aid to Industry

91. The work undertaken by the various National Laboratories on behalf of Government departments and industry can be broadly classified under the following categories:

(a) Intelligence, (b) Minor investigations and (c) Major investigations. The rules governing technical aid rendered by National Laboratories to industry are given in Appendix XVIII.

92. The Committee observe that the rules do not lay down clearly the principles to be followed for the recovery of charges for the various categories of work undertaken by the National Laboratories on behalf of industry. They understand that in the Central Glass & Ceramic Research Institute, the practice is that where an individual party presents a problem that requires special investigation, nominal charge is made to cover part of the expenses incurred by the Institute. The Committee do not consider that there is enough justification for making only a nominal charge in such a case. In this connection, the Committee would like to refer to the system obtaining in the U.K. regarding the recovery of charges for work done by the research establishments of the CSIR for industry (Appendix XIX). They understand that the cost of doing a specified piece of work by a research establishment 1559(Aii) L.S.-4. usually amounts to charging the salaries of the staff engaged plus an overhead charge which may be from 80 to 360 per cent.

93. The representative of the Ministry expressed the view that it would not be advisable to have rigid rules for charging industry when the research organisation was in the process of building up relationship with industry. The Committee appreciate that every endeavour should be made to build up the relationship between the CSIR and industry, but they do not see how the laying down of definite principles or rules for the recovery of charges for work done by the National Laboratories on behalf of industry would hinder the development of relationship with industry. They also do not see any reason why full charge of the cost of a piece of work done by the National Laboratories for industry should not be made. They have no reason to think that industry will be unwilling to meet the expenses for services rendered. The Committee recommend that the system obtaining in the U.K. in this regard may be adopted, with such minor modifications as are considered absolutely necessary.

94. The following table shows the receipts of 14 National Laboratories for 1956-57, 1957-58, 1958-59 as also their estimated receipts for 1959-60, expressed as percentage of the respective total expenditure of each of those Laboratories, the receipts from other National Laboratories being nil:—

			1956-57	195 <b>7-</b> 58	1958-59	1 <b>959-6</b> 0
1. N.P.L.		•	6.38	10.72	7.11	N.A.
2. N.C.L.			0.06	0.07	0.05	1.95
3. N.M.L.			0.52	0.56	0.47	N.Á.
4. C.F.R.I.			4.62	2.02	2.92	6.06
5. C.G.C.R.I.		•	o∙98	2.07	2.56	3.04
6. C.D.R.I.		•	0.55	0.65	0.76	0.63
7. C.F.T.R.I.			0.06	0.08	0.17	N.Ă.
8. C.L.R.I.			0.13	0.68	0.62	0.60
9. C.B.R.I.			0.102	0.026	0.206	1.136
10. C.R.R.I.	•		1.40	0.22	1.04	0.57
11. C.E.C.R.I.			0.03	0.07	0.14	0.53
12. N.B.G.			1.2	I • 2	1·2	1.2
13. C.M.R.S.			1·8	1.2	3.2	N.A.
14. R.R.L., Hyd	lerat	ad.	0.23	0.53	o·88	N.A.

95. It is observed that the receipts are very small and in some cases, the information is stated to be not available. The Committee are unable to understand how even an estimate of the receipts is not available in respect of certain National Laboratories. The Committee appreciate that none of the National Laboratories could be expected to cover their cost by receipts for the work they do, but the receipts such as they are, are disappointing. In this connection, they would like to quote below the receipts of some of the comparable research

Research Laboratory	Receipts as tage of exp	a percen- penditure
	U.K.	India
N.P.L.	37.6	7.11
Chemical Research Laboratory	39.3	0.02
Building Research Institute	6.2	0·2C6
Fuel Research Institute .	1.8	2 · 92
. Road Research Laboratory	11.4	1.04

Laboratories in U.K. and in India for 1958-59 expressed as percentage of their respective total expenditure.

It will be seen that the percentage of receipts to the total expenditure in the Research Laboratories in the U.K. except in the case of Fuel Research Institute is very much higher than that of their counterparts in India.

The Committee recommend that concerted and determined efforts should be made by the Council and its National Laboratories to increase the receipts for the work undertaken by the National Laboratories on behalf of industry and Government Departments. The Committee trust that if the present system of charging fees by the National Laboratories is modified on the lines of the system obtaining in the U.K., it would help in augmenting the income accruing to the National Laboratories from this source.

## F. Need for Research Cells in Industries

96. The Committee were informed by the Secretary of the Ministry that he had discussed the question of introduction of research cells in the industries with the Ministry of C & I which favourably reacted to the idea. The Committee consider that this question is of vital importance and should be vigorously pursued. The industries may be given suitable inducements, if necessary, for introducing research cells in their respective industries.

## G. Need for industry to be more research minded

97. In the First Five Year Plan, the Planning Commission, while stressing the need for industrial and scientific research for increasing industrial productivity, pointed out that apart from the part to be played by Government in this field, "a great deal must depend on the interest and initiative which private industry shows in organising and promoting industrial research, not only from the point of view of increasing efficiency and reducing costs in particular lines but in the interest of overall industrial advance."

98. The Committee observe from the following figures of expenditure on research incurred by industry in the U.K. U.S.A. and India, as furnished by the CSIR that the expenditure by industry in India is very small in comparison with that of U.K. and U.S.A.:--

	Expenditure
U. K. (Million $f$ )	ī85 <b>*</b>
U.S.A. (Million \$)	7,200+
India (Million Rs.)	2.7@

The Committee are of the view that this clearly points to the need for greater efforts being made than at present to bring home to industry the importance of industrial research for its own advancement no less than that of the country.

### H. Assessment of Research Needs

99 The Committee understand that no studies have yet been undertaken of the research and development resources and requirements of the particular sectors of the industry. They consider that such studies are desirable and should be instituted. In this connection, the desirability of appointing a professional group of social scientists at the Headquarters of the CSIR to undertake a continuous study of (a) service of research institutions to the industry (b) the needs of industry in terms of research and development, and other cognate matters may be considered.

### I. Cooperative Research Associations

100. For the conduct of industrial research on a co-operative basis, the following Co-operative Research Associations have been formed by the industries concerned, at their own cost, Government assisting with contribution and offering special facilities such as allowing contributions for research to be treated as a part of normal business expenditure of an industrial concern under Section 10(2)XIII of the Indian Income Tax Act:—

- (i) Ahmedabad Textile Industry's Research Association (1947).
- (ii) Silk and Art Silk Mills' Research Association (1950)
- (iii) South India Textile Industries Research Association (1951)
- (iv) Indian Rubber Manufacturers Research Association (1958).
- (v) Indian Paint Research Association (1959).

The first Association to establish a Laboratory was Ahmedabad Textile Industry's Research Association in the year 1957, the second being the South India Textile Industries Research Association which established a laboratory in 1958. The Laboratory of the Silk and Art Silk Mills' Research Association is under construction. The Rubber Research Association has started its work in the National Chemical

<sup>\*</sup>In 1955-56.

<sup>+</sup> In 1957.

<sup>@</sup>In 1955-56 from budget figures of private Research Associations Institutes.

Laboratory. The respective industries which have formed these Associations refer their problems to their respective research institutes. The Committee understand that efforts are being made to organise a Research Association for each of the following industries:—

- (i) Foundry Industry.
- (ii) Cement and Concrete Industry.
- (iii) Mica Industry.

### Pattern of assistance given by CSIR

101. The Governing Body of the CSIR at its meeting held on 31st March 1959 laid down the following pattern of financial assistance to be rendered by the C.S.I.R. to Co-operative Research Associations:—

- (i) A non-recurring grant not exceeding 1/3rd of the total capital cost of the project subject to a maximum of Rs. 15.0 lakhs; and
- (ii) a recurring grant not exceeding half the annual recurring expenditure subject to a maximum of Rs 5.0 lakhs.

The terms and conditions for giving assistance to the Co-operative Research Associations are given in Appendix XX.

102. The Committee note with regret that only five Co-operative Research Associations have been formed in India so far. In this connection, they would like to refer to the position obtaining in the U.K. in this regard. In the U.K., there are at present thirty-nine Cooperative Industrial Research Associations and ten smaller organisations which come under the Government scheme of Co-operative Industrial Research Associations instituted by the Department of Scientific and Industrial Research. These Associations cover 55 per cent of the manufacturing industry and their main income is derived from industrial subscriptions supplemented by revenue grants from the Department. Of the remaining 45 percent of the manufacturing industry, 27 percent is served by the Research Laboratories of the DSIR or its own resources or privately run associations and only 18 percent have no facilities at all. It will thus be seen that the Cooperative Industrial Research Associations play a very important role in the U.K.

The Committee are of the view that co-operative research associations are bound to bring important benefits to its constituents. Cooperative research economises on money and scientific manpower. It offers a scientific service to firms that cannot afford research in general. It facilitates an exchange of technical information and other forms of mutual assistance. Finally, it builds a store of knowledge on which the nation can draw. The Committee are of the opinion that there is considerable scope in India to make industries interested in forming industrial research associations. They understand that besides the Foundry, Cement and Mica industries, there is scope for setting up of Co-operative Research Associations for industries like Electronics, Small machinery manufacture footwear and automobile. They, therefore recommend that active steps should be taken to encourage the formation of Co-operative Research Associations for all these industries.

### New Delhi;

The 9th March, 1960. The 19th Phalguna 1881 (Saka).

## H. C. DASAPPA,

Chairman, Estimates Committee.

	s/Institutes	of tempo-	Class IV % to Col. 3	Π·	~29%	Ì	%.En .	67.47%	
	Laboratorie	Percentage rary staff	Other than Class IV % to Col. 2	IO	. 32%	à	90 %	26.33%	
	he National	of per- aff	Class IV % to Col.	6	%12.	Ì	37%	32.53%	
	stariat and t	mi-Percentage ( unc-manent sta cen- tioned F	Other than Class IV % to Col. 2	œ	68%	Ìd	% 0/	23.67%	,
	.S.I.R. Secre	bical/admi- Pero staff (sanc- ma ith percen- tal sanctioned 5 th.	Class IV % to Col. 3	2	126	%66	%E0.5E	19	33.33%
Ħ	19) J) in the C. ment staff.	Non-technic nistrative st tioned) with tage to tota strength	Other than Class IV % to Col. 2	ور <sup>ا</sup>	327	74%	17.18%	- 20	18.23%
APPENDIX I	Vide para 2 Nass IV staj and perme	und tech- unctioned) utage to oned	Class IV % to Col. 3	2°	I	%I	64.07%	122	66•66%
	(V inical and Cl temporary	Scientific an uical staff (san with percents total sanction stren	Other than Class IV % to Col. 2	4	108	26%	82.12%	341	81.77%
	al, Non-Tec ercentage oj	Cotal sanctioned Sc strength w to	Class IV	en	127	026		166+17	
	ff (Technical and per		Other than Class IV	9	435	426 4		376+41 (P.P.)	
	Statement showing the sanctioned st	Name of Laboratory		Ι,	I. Sectt. of C.S.I.R., New Delhi	2. N. P. I., New Delhi		3. N. C. L. Poona	

49 :~-

F.		8	£	41	\$ . *	ف	. 2	ø	· <b>6</b>	2	H
4.º N.M.L. Jamahodpur		414:	.98	319.	133 -	- 95	23	29.7%	13.4%	52.1%	76.3%
5: C.F.R.I., Jealgona	•	713.	458.	77.0% 612 86:0%	71.5% 365 80.75%	23.0% 100 14%	28 · 5% 87 19 · 24%	%16.65	7.5%	46.63%	92.5%
6. C.G.C.R.I. , Calcutta .	•	341	126	180	87	61 25,31%	39 .05%	\$3.53%	32.32%	46:47%	77-78 %
7. C.L.R.I., Madras	•	169	120	111	79% 79%	58	41 41	45.6%	6.7%	54~4%	%E.E6
8. C.D.R.I. Lucknow	•	241	159	182	110	59	49	62.2%	18.2%	37.8%	% <b>8</b> ·18
9. C.F.T.R.I., Mysore	•	326+48 (P.P.)	146+2 (P.P.)	2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2	88 89-7%	23%	50.9% 60 40.3%	47%	22%	<b>53%</b>	78%
10. C.B.C.R.I., Karaikudi	•	161	86	141 73:81%	57 66.28%-	50 26. 19%	292.72%	49.21%	6.81%	\$0•7 <b>9</b> %	94 · 19%
11. C.B.R.I., Rootkee		321	82	163 73·76%	46 56.1%	58 26·24%	36	33.48%	14.63%	66+52%	85.37%
12. C.S.R.I., Bhaynagar		6 <sub>8</sub>	<del>4</del> . 6	61 68·54%	18 41.86%	28 31·46%	25 58+14%	46.06%	•	\$3.94%	%001

Ë	N.B.G., Lucknow	•	177	145	127	<b>8</b> 6	31	47	%6.EE	:	%1.99	100%
					%61.12	62.29%	28.81%	32.41%				
1	. C.E.E.R.I., Pilani	•	611	20	82	. 17	37	33	%61	:	%18	%00I
					%69	34%	31%	66%				
ñ	. C.M.R.S., Dhanbad	•	153	19	122	32	31	29	4%	:	%96	%00I
					79.73%	52.45%	20.27%	47.55%				
16	. R.R.L., Hyderabad	•	122	163	173	84	48	79	49.7%	%1.09	80.3%	%E.6E
					78.2%	\$1.5%	21.8%	48 • 5%				
17.	. I.I. B. & E.M., Calcutta		88	46	59	25	29	21	%E.E	:	%2.96	%00I
					67%	54.4%	33%	45.6%				
18,	C.R.R.I., New Delhi	•	371	148	661	93	72	55	52.%	13%	48%	87%
					73:4%-	62.8%	26.6%	37.2%				
<b>Š</b> ĩ	Bill & T.M., Calounna.		ъ	‡	55	<b>6</b> 1 .	18	25	3.67%	:	%EE.96	% 001
					75-34%	43.19%	24.66%	56.81%				
30.	. R.F.L., Jammu	•	20	37	55	ŝ	IS	22	%1.12	%5.55	%6.21	44.5%
					78.5%	18.5%	21.5%	81-5%				
21.	C.P.H.E.R.I., Nagpur	•	141	52	108	32	36	20	58.3%	%2.69	41.7%	30.8%
					75%	61.5%	3°82	38-5%				
22.	N.A.L., Bangalore	•	49	0	33	:	16	Io	43%	:	57%	%00I
					67.35%	:	32.65%	%00I				
j.												

<b>I</b>	6	3	4	\$	Q	L .	00	Q	OI	п
23. CIMPO, New Delhi	-	6	<b>6</b>		S	2			%00I	%00I
			%82		72%	%00I ··				
24. C.M.E.R.I. Durgapur	94	24	68	4	26	20	7%	4%	63%	%96
			72%	17%	28%	83%				
25. R.R L., Assam Jorhat 7.	22	II	01	I	12	0		:	%00I	ioo%
			45.5%	%6	54.5%	61%				
26. Central Scientific Instruments Organisation, New Delhi	4	<b>*</b> H	I	Nil	ŝ	I	50%		50%	%00I
			- 25%		75%	100%				

# APPENDIX III

(Vide para 31)

List showing the details of vacant Scientific posts etc. (other than auxiliary Technical) in the National Laboratories/Institutes.

Name of the Labo- ratory Institute	Designation of Post	No.	Remarks
I	2	3	4
I. National Physi - A cal Laboratory, New Delhi	Assistant Director	. 2	
New Denn.	J.S.O. (Accustics) S.S.A.	. I . 4	
2. National Chemical	Assistant Director	. 2	*Against the post of
Laboratory, rooma.	S.S. O (Gr.II)	1+1 <b>P@</b>	appointed J.S.A.
	J.S.O. S.S.A*	. 3 13∔5P@	]@ Pilot Plant.
	Head Laboratory Supervisor .	. i	
3. National Metallur-	Asst. Director	. і	
Jamshedpur.	S.S.O. (Gr. II) S.S.O. (Gr. I).	. I	. (
	Electrical Engineer M2chanical Engine	. i er 1	2
4. Central Fuel Re- search Institute	Deputy Director	I	The offer of appoint-
Jealgora (including CSSs & Pilot Plant)	Design Engineer Plant Engineer	. I . 3**	<ul> <li>issued.</li> <li>**Offer to one candidate has already been sent who is in West Germany.</li> </ul>
	S.S.O. (Gr. II) J.S.O.	. 12 . 4	

	54			
I	2		3	4
	Š.S.Å.	•		The selection has. since been made and offers of ap- pointment have al- ready been issued by the Director C.F.R.I.
5. Central Glass & Ceramic Research	Deputy Director	•	I	
Institute, Calcutta.	S.S.O. (Gr. I).		3	
	J.S.O	•	3	
	Elect. Engineer	•	I	
6. Central Drug Re- search Institute,	Asst. Director	•	4	
Lucknow.	S.S.O. (Gr. II) S.S.A.	•	1 4	The selection has since been made
7. Central Food Te -	Asst. Director.	•	2	
Institute, Mysore.	S.S.O. (Gr. I). J.S.O	•	3 5+ tP@	
	Ś. <b>S.A.</b> .	•	13+ 3P@	(a) Pilot Plant Pro- ject.
8. Central Road Re- search Institute, New Delhi.	Assistant Director	•	I	
9. Central Building Research Institute	Deputy Director	•	I	
Roorkee.	Asstt. Director	•	İ	Post offered to one of MES Offi- cers, Ministry of
	S.S.O. (Gr. 11)	•	9	2 posts have been offered to MES Officers (Ministry of Defence).
				Candidates have been selected for the re-
	J.S.O S.S.A	•	3 4	mann
	J.S.O S.S.A		3 4	

	I	2		3	4
10	. Central Leather	Asst. Director	•	I	narka () narka na kata ang ang ang ang ang ang ang ang ang an
	Research Institute,	S.S.O. (Gr. I).	٠	I	
	Madras	S.S.A.	•	3	
TT.	Central Electronics	DirectOr	•	2 I	
	Engg. Research Ins-		•	-	
	titute, Pilani.	Asstt. Director	•	I	
		S.S.O. (Gr. I).	•	3	Candidates have been
		J.S.O	•	4	selected. 2 candidates have been selected.
		4 2 2		•	
		Electrical- <i>Cum</i> -Me	• -	3	
		chanical Engr.	•	I	
12	Central Salt Re -	S.S.O. (Gr. II)		3	
	search Institute,	J.S.O	•	ĩ	
	Bhavnagar.	<b>S.S.A</b>	•	5	
13.	Central Electro-	Asst. DirectOr		2	
2	Chemical Research	S.S.O. (Gr. II)		2	
	Institute, Karaikudi	Mech. Engineer	•	I	
		P.A. (Tech). to Du		-	
		S.S.A.	:	8	
		Sr. Librarian	•	I	
т4.	Central Mining Re-	Deputy Director		т	
	search Station,	S.S. O. (Gr.I)	•	4	
	Dhanbad	S.S.O. (Gr. II).	•	3	
		J.S.O	•	4	
		S.S.A		12	
15.	National Botanic	J.S.O	•	5	
	Gardens, Lucknow.	Clerk of Works	•	I	
		S.S.A.	•	8	
		Laboratory	0	I	
-6	Indian Instra	Agente Director		-	
10.	Biochemistry &	SSO (Gr II)	•	1	
	Experimental Medi-	J.S.O.	:	/ <del>1</del> ੨	
	cine, Calcutta.	S.S.A		ĭ	

, I	2		.3	4
17. Birla Industrial & Technological Mu - seum Calcutta.	Senior Technical Officer (Gr. II)		I	Offer being sent.
18. Regional Research Lab., Hyderabad.	S.S.O. (Gr. I) S.S.O. (Gr. II) S.S.A. J.S.A. Store Supervisor Lab. Supervisor	• • • •		The selection Com- mittee has met and selected can- didates for these posts.
19. Central Mechanical Research Institute , Durgapur.	Assistant Director S.S.O. (Gr. I) J.S.O S.S.A	••••••••••••••••••••••••••••••••••••••	1 3 6 11	
20. Regional Research Laboratory, Jammu	S.S.O. (Gr.II) J.S.O S.S.A	• •	2 5 5	
21. Central Public Health Engg. Re- search Instt., Nag- pur.	Asstt. Director S.S.O. (Gr.I) S.S.O. (Gr. II) J.S.O Purchase Officer S.S.A Sr. Mech. Assistan		2 4 10 8 1 1 2	
22. Central Indian Me- dicinal Plants Or - ganisation, New Delhi	Asstt. Director	•	I	
23. National Aeronau- tical Research Lab- oratory, Bangalore.	Assistant Director S.S.O. (Gr. I). S. S. O. (Gr.II) J.S.O. S.T.A	•	2 I 2 6	Offer of appointment has been made against one post.

I	2		3	4
	S.S.O. (Gr. II) J.T.A. Sr. Draftsman			These posts relate to the scheme on Uti- lization of Wind Power which has been merged in the N. A. R. L. The actual creation or- ders! for these posts have not been issued as yet.
24. Regional Research Laboratory, Assam.	S.S.O. (Gr. I). Draftsman. (Sr.)	•	I I	
25. INS <b>D</b> OC, New Delhi.	Sr. Translating Abstracting Offic Jr. Photographic Officer. Sr. & Jr. Document tion Officers	й ег а- . 1 (	I I each	

### APPENDIX IV

### (Vide para 40)

List of posts in Secretariat of the C.S.I.R. and the National Laboratories/Institutes which are exempted from the purview of the orders prescribing reservations in favour of candidates belonging to Scheduled Castes and Scheduled Tribes

1. Director-General, Scientific & Industrial Research.

2. Assistant Director-General, Scientific & Industrial Research.

3. Directors; Deputy Directors; Assistant Directors; Senior Scientific Officers and Junior Scientific Officers.

4. Chief Editor.

5. Industrial Liaison Officer and Regional Liaison Officers.

6. Patents Officer.

7. Engineer Officer; Chief Engineer; Electrical, Chemical, Mechanical and Civil Engineering Posts.

8. Research Engineers, Project Engineers and Workshop Superintendents.

<sup>•</sup> 9. Assistant Director (National Register Unit), and Planning Officer.

10. Under Secretaries/Administrative Officers (Grade I)

	is total number of employees 1959.	r 1led R <b>ema</b> rks s ees	7	*Inclusive of temporary posts.	*Inclusive of 18 Non- Gazetted posts.
	vis-a-vi	Numbe of Schedu Tribe	9	::::	::1
	ibes employee boratories as	Number of Scheduled Castes employees	5	; : و م	23 ° · · · 5
<b>DIX V</b> Ira 40)	heduled Tri ational La	Total number of employee	4	360 44 *46 *60	36* 36* 125
APPEN (Vide pe	Castes and Sc posts in the N	Class of posts	3		elhi I II IV
	atement showing the total number of Scheduled in Class I, II, III and IV	Name of the Laboratory/Institute	2	National Physical Laboratory, New Delhi	Central Road Research Institute, New D
	Sti	S, S,		I	0

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m	I II (Gazetted) II	(Non- Gazetted) III IV		I I I I I I I	I III IVI	I
2	Central Salt Research Institute <sup>6</sup> Bhavnagar		Bi la Industrial & Technological Museum, Calcutta	Ce itral Drug Research Institute, Lucknow	Central Electronics Engineering Research Institute, Pilani	Central Public Health Engineering Research Institute, Nagpur • • •
I	m I		4	Ś	Q	٢

*Separate figures for Scheduled Castes and Scheduled Tribes not given.			*Separate figures for Scheduled Castes and Scheduled Tribes are not given.	*(Inclusive of 19 non- gazetted posts).
::ы *		'n *	0 *	3 17
11 111 12 12 12 12 12 12 12 12 12 12 12	I III IV 2 2 2 2 2	I 5 II 15 III 47	IV 46	I II 38* IV 63
	8 Central Mechanical Engineering Research Institute, Durgapur	9 Central Mining Research Station, Dhanbad		10 Central Building Research Institute, Roorkee

	またがしたいで、ある、シストレージのおおおおお したまたのです。その時にあるまたのでは、このです。 ちゅうちゅう しゅうしょう しゅうしょう しゅうしょう しゅうしょう しゅうしょう しゅうしょう しゅうしょう しゅうしょう	Representation of Financial				and the second descent second se		
Г	7	°,	4	Ś	9	2		
II	Central Electro-Chemical Research Insti- tute, Karaikudi	II	11 27*	::	:::	*(Inclusive gazetted	of 18 Class	-uou
		III VI	101 82	<b>6</b> 0	: "	posts).		
12	Central Leather Research Institute, Madras	1 11	14 26*	::	• :::	*(Inclusive Gazetted	of 9 Cláss	-uou II
			80 95	44	: :	posts).		
13	National Metallurgical Laboratory, Jam- shedpur	II	28 62* <sup>.</sup>			*(Inclusive gazetted	of 31 Class	-uou -uou
		III VI	210 110	4 11 ,	ω4	posts).		
14	Central Fuel Research Institute, Jealgora		Details ot fur- ished)	:	:			
			-challer	 1 29	: × 68			

			63				
-uou II		-non 11		-uou		II -uou	
of 24 Class		of 5 Class		of 24 Class		of 29 Class	
*(Inclusive gazetted posts):		*(Inclusive gazetted posts).		*(Inclusive gazetted pOsts).		*(Inclusive gazetted posts).	•
,	٢4		NF		1 28		4
16 39	127 107	1	16 24	40 40 40	161 711	29 51*	133
1 11		II		II		I II	111
15 Central Glass and Coramic Research Insti- tute, Calcutta		6 Regional Research Laboratory, Jammu and Kashmir		7 Central Food Technological Research Insti- tute, Mysore		8 Regional Research Laboratory, Hyderahad	
S.I.		16		17		I 8	

6 7		*(Inclusive of 13 non- gazetted Class II	poats).					
S	56	;;;	ω EI	, . <b>,</b>	•••	L I		- 6
4	178	25	110 138		31 27	269 159	<b>ک</b>	4 53 43
3	NI	1 T			I		I	
2		National Botanic Gardens, Lucknow			National Chemical Laboratory, Poona		Indian Institute for Bio-chemistry & Ex- perimental Medicine, Calcutta	· · · · · · · · · · · · · · · · · · ·
1		61	·		20		21	

# APPENDIX VI

(Vide para 41)

Statement showing the percentage of expenditure on Administration in relation to the total expenditure of the Laboratory/Institute.

SI. No.	Name of the Laboratory/Institute	1957-58	1958 <del>-</del> 59
I	National Physical Laboratory, New Delhi .	12.03	9.25
2	National Chemical Laboratory, Poona .	9.60	9°44
3	National Metallurgical Laboratory, Jamshed-	0	0.10
	pur Central Fuel Research Institute Lealgorn	9.28	• 45
4	(including Coal Survey Stations)	8.13	5.64
5	Central Glass & Ceramic Research Institute,	0 - 5	J 4
2	Calcutta	9.85	10.38
6	Central Food Technological Research Insti-		
	tute, Mysore	12.24	10.63
7	Central Drug Research Institute, Lucknow	11.95	11-24
8	Central Road Research Institute, New	•	
	Delhi	<b>9·9</b> 5	14.02
9	Central Leather Research Institute, Madras	14.21	15.74
10	Central Electro-Chemical Research Institute,		(-
	Karaikudi	12.50	15.02
11	Central Electronics Engineering Research		
	Institute, Pliani	15.79	12.24
12	central Building Research Institute, Roor -		12.80
70	Control Solt Decearch Institute Decearch	11.05	12.00
13	National Potenia Gordona, Lucknow	15.25	13.09
14	Control Mining Possarch Station Dhanhad	15.73	10.93
15	Indian Institute for Biochemistry and Ex	0.3/	5.99
10	nerimental Medicine Calcutta	7.80	17.33
17	Regional Research Laboratory Hyderabad	7.62	0.67
1/ 18	Rirla Industrial & Technological Museum	13.19	90/
10	Calcutta	21.54	11.28
10	Regional Research Laboratory, Jammu	21 34	10.00
20	Central Mechanical Engineering Research	••	10 99,
	Institute, Durgapur		2.75
			- ,5

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#### APPEN

(Vide

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Name of the donors & Laboratory? Institute for whom donation given	44-45	45—46	. <b>46—</b> 47	4748	48—49	49 <b>— 50</b>
1	2	3	4	5	6	7
M s All India Glass Manufacture Federation, Bengal Glass Manu- facture Association, U.P. Glass Works Ltd., Moradabad and Shri U.N. Brahama Chari (Cen- tral Glass & Ceramic Research Institute, Calcutta)	0.200	0.100				
Trustees of Sir Ratan Tata Trust (National Metallurgical Labo- satory, Jamshedpur)	0· <b>43</b> 3	0·333	0.334		5.00	
Dr. Rm. Alagappa Chettiar Cen- tral Electro-Chemical Research Institute Karaikudi				2.500	2.500	1.000
Sir Dorabji Tata Tust and M/s. Tata Iron & Steel Co. Ltd., N.C. L., Poona					5.000	
South Indian Tanneries, (C.L.R.I. Madras)					0.200	0.223
Shri G.D. Birla (Birla Education Trust), Ceeri, Pilani						•.
Shri I.D. Jalan, C.M E.R.I Durgapur	••			• ·		••
Shri Mohan Singh C.F.T.R.I., Mysore					••	••
Shri Ram Kumar Agarwala (C.G. C.R.I. Calcutta)						•••
Shajimar Tar Products	0.024	0.024				••
Steel Brothers	0.032					••
TOTAL	0.689	0-457	0.334	2.500	13.000	1.553

Statement showing year-wise contribution (Donations) realised by the Council of Scientific and

This does not include the contribution made by the Coal Board and the State Govern

#### DIX VN

Industrial Research from private industralists etc. since its Establishment.

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							`	(Rupees	s in l <b>akh</b> s)
50—51	5 <b>1—52</b>	52-53.	53—54	54—55	55—56	56—57	57—58	58 <b>—59</b>	Total
8	9	10	11	12	13	14	15	16	17
	•								
		0.100							0 <b>.400</b>
3.000	- 3·700								12.800
1,300	1.000	0.850	0.250	0 <b>·300</b>	0.200	0.500			10.700
3 • <b>300</b>									8.300
0 <b>.030</b>	0•132		••	••	••				1.512
		0.210	••	••	9.000	4.99	4.000	2 500	21.00
			1.000.						1.000
	0.020								0.020
	2.000								2.000
									0.048
									0.035
7.630	6.882	1.460	1 • 250	0.300	9.500	5.490	4.000	2.500	57 <b>• 545</b>

ments as the information is required in respect of private industries.
Ś	Name of the Laboratory	Name of the	Land		Buildi	sgn
No.		Domor	Details	Estimated Value	Details	Estimated Value
				Rs.		
I	Central Fuel Research Institute, Jealgora	Raja of Jharia.	I 50 acres	4,50,000		
7	Central Road Research Institute, New Delhi	Archbishop of	31 acres	5,00,000		
ŝ	Central Electro-Chemical Research Institute, Karaikudi.	Delni. Dr. Rm, Alagap- pa Chettiar.	300 acres	6,00,000		
4	Birla Industrial and Techni- cal Museum, Calcutta.	Birla Brothers.	5 bighas of land.		The whole build Birla Industri cal Museum donated by th	ding in which the ial & Technologi- is situated was he Birla Brothers.
		1	481 acres & 5 Bighas.	1		

APPENDIX VIII (Vide para 43)

### APPENDIX IX

### (Vide para 53)

# Note detailing the scope and procedure for giving grants-in-aid by the C.S.I.R.

Scope.—The system of grants-in-aid to research schemes is mainly to further the research efforts in the country in the fields of science, technology and engineering. The main criterion for giving a grant is timeliness and promise of a piece of research. It also covers training of research workers both at the post-graduate and post-doctoral levels, and development of leaders of scientific thought in the various disciplines. Whenever a research committee feels that a particular line of work has not developed in the country, the committee can sponsor a programme of research and entrust it to scientists in the universities and other research institutions through the grants-in-aid system. It also enables schools of research to be built up round senior scientific workers.

*Procedure.*—Firstly, Junior and Senior Fellowships are awarded to promising young workers subject to the condition that they are under competent guides. Secondly, Senior Scientific Investigators are entrusted with schemes which have end-objectives well defined. For these schemes, the investigators are given small equipment grant to supplement existing equipment, contingency and research assistants. Thirdly, block grants are provided to senior scientists to develop schools of research.

The grants-in-aid are usually given in two six monthly instalments by the C.S.I.R., the first instalment for the period 1st April to 30th September, and the second from 1st October to 31st March. These are sanctioned under three sub-heads, 'Equipment', 'Contingencies' and 'Staff'. The amounts of grants-in-aid are placed at the disposal of the heads of the Institute or the University where the schemes are located. The amount under "Equipment" is made available in lump sum to enable the Investigator-in-charge to purchase necessary equipment. The grant sanctioned under 'contingency' and 'staff' is placed at their disposal on procurement of the equipment for research.

The second and subsequent instalments of the grants-in-aid are paid on eccipt of:---

- (i) statement of expenditure incurred against the earlier instalment; and
- (ii) progress report on the work done in the scheme during that period to be submitted to the Chairman of the Committee under whose purview the research scheme falls for consideration by the Research Committee.

The accounts of the research schemes are audited by the Accountants General of the States where the schemes are located at the close of the financial year.

### APPENDIX X

# (Vide para 55)

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# List of instances in which the results of research carried out in the National Laboratories/Institutes and under sponsored research projects have received international recognition.

1 As many as 4,210 research papers have been published in internationally recognised journals as a result of the work carried out in National Laboratories and sponsored research schemes upto March, 1959. Of these, 679 papers have been published in foreign journals. Frequent requests from foreign countries have been received for reprints of some of these papers thereby showing that they have excited international attention.

2. Some of the papers published have been appreciably commented upon as evidenced by reviewing committee report, mention in other journals and personal communication to the authors.

The following reference to the papers of Dr. K. S. Krishnan and Dr. S. Parthasarathy has been made in the Report of the Second Reviewing Committee (p. 10).

- "A recent paper on the Thermionic Constants of Metals and Semi-conductors has already excited considerable interest in industrial laboratories in other lands, while Krishnan's work concerning quadrature will have many applications in theoretical analysis; the work that he has been pursuing on the part played by polarisation fields in the interpretation of anharmonicities in the oscillation of ions in crystals is also of outstanding importance."
- "It is particularly suitable in relation to the Director's personal contribution to physics that in the Acoustics Division, thermosonics forms a special activity, and the work on ultrasonics under Dr. Parthasarathy seems well designed to bring the laboratory well to the fore in this field."

Ti02 from bauxite sludge.—A part of laboratory investigation on this problem carried out by the National Chemical Laboratory and published in the Journal of Scientific and Industrial Research, 292-7(1955), received the following comments:—

"Two papers in the latest issue of the Journal of Scientific and Industrial Research, admirably typify the modern progress of applied research in India..... India's science was always to be respected for its fundamental or theoretical contributions although the number of workers and centres was limited. Today the quality of applied research is most impressively catching up." (Chemical Age, London, 13th August, 1955, p. 315)

The work on the Electroplating Projects of the National Metallurgical Laboratory, Jamshedpur—the fundamental work carried out at the laboratory and the published work on "Austenitic Grain size control in steels" have received appreciative comments from foreign scientists and foreign journals. A review of the work published in the British Journal "Metal Treatment and Drop Førging" in April, 1952 is reproduced below:—

- "This paper is an excellent indication of the progress that is being made in that country. The 36 pages of text, which include an exhaustive bibliography, in addition to 81 micrographs and figures, incorporate not only the original work of the author but give a full account of the work of others in the field."
- "In discussing the theoretical aspects of the problem, after giving a full account of the various hypothesis put forward; they express themselves in favour of the 'solution theory' in which the aluminium remaining dissolved in the steel, in distinction to that present as alumina, is responsible for the prevention of grain growth. In view of the fact that Dr. Nijhawan was awarded his degree of Doctor of Philosophy at the University of Sheffield on his thesis concerned with an experimental investigation of controlled grain size, and that his main conclusions were that a concentration of aluminium at the grain boundaries retarded grain growth, and necessitated a higher temperature being attained before normal growth took place, it is very satisfactory to note that these experiments made with industrial melts have confirmed those views."

An extract of the review made in the Foundry Trade Journal, England of the Smyposium publication of the National Metallurgical Laboratory, Jamshedpur on "Recent Developments in Foundry Technology" is reproduced below:—

> "This issue runs to nearly 400 pages and prints 46 technical papers of which nine came from this country. The papers are only fairly well balanced, for there is only one paper on aluminium castings, and none on copperbase alloys. This, however, does not mean that the Symposium was without interest for non-ferrous foundrymen, for there are papers on the Co2 Process, Melting, Plant, sand control, mechanization, and a host of kindred subjects of real interest to everybody in the

industry. The general standard of the papers submitted is high and equal in every way of those presented to European conferences and, at the price asked, is very good value for money."

Fundamental work on 'Surkhi as a Puzzolana' conducted at the Central Road Research Institute has elicited appreciative comments from certain foreign experts in the line. Relevant extracts from a special article entitled 'A lost opportunity in mortar cements' from Rocky's notes, by Nathan C. Rockwood, appeared in Rock Products are given below:—

(1) The Committee on lime of the American Society for Testing Materials is in the process of adopting a proposed specification for puzzolanas for use with lime; (2) An article on 'A New Approach to the Problem of Surkhi as Puzzolan' by S. R. Mehra, Director, Central Road Research Institute, New Delhi, India, was published in Indian Ceramics, January, 1957. The use of lime-puzzolan mixtures for hydraulic cement in India goes back further than any written record. It was probably from the Far East that the Greeks and Romans learned how to make and use it. Hence it is interesting and appropriate that Indian Scientists should write about the use of such mixtures.

3. The work carried out has been the subject of discussion in international symposia and scientific meetings and by scientists of \*international fame.

The work in the field of coal carbonisation and on blending characteristics of coals carried out by the Central Fuel Research Institute has been highly appreciated by Russian, German and British Scientists.

Dr. H. H. Storch, Director, Basic Research Department, Standard Laboratories, U.S.A. says: "I have been keenly interested in the data published by you and your staff and I wish to take this opportunity to express my appreciation of this contribution to our knowledge of the properties of the coal".

Excerpt from the letter from late Sir Alfred Egerton, addressed to the Director, Central Fuel Research Institute a few months back: "First, I would like to congratulate you in the activity which you engender at the Institute in the problems of constitution of coal. It is a great advantage to have an active centre working on the problem with experience of coal of different origin...go ahead with your interesting work".

4. The results in some cases have been included in text books. The investigations on dyestuffs carried out under CSIR sponsored research schemes by Dr. K. Venkataraman have been incorporated in the Book in 2 volumes on "Chemistry of Synthetic Dyes" published by the Academic Press, New York. Dr. Venkataraman has acknowledged this as follows in the preface to the book "Much of the work in my laboratory has been under the auspices of the Council of Scientific and Industrial Research". **Pristimerin:** Investigation on the structure of pristimerin and colastrol (Kulkarni and Shah: Nature, 173, 1237 (1954); Shah, Kulkarni and Thakor: J. Chem. Soc. (London) 2515 (1955) two naturally occurring colouring matters have found reference in a book published by Messrs. Butterworths Scientific Publications, 1957.

Kamlolenic Acid: The structure of Kamlolenic acid elucidated by Gupta, Sharma and Aggarwal: J.Sc.Ind. Res. 11B 463 (1952) has been confirmed by independent work of Calderwood and Gunstone (J. Sc. Food and Agric. 5, 382, 1954). Reference to the above work has been made in the following papers: Constitution and stereochemistry of the kamlolenic acids—by L. Crombie and J. L. Taylor, J. Chem. Soc. 2816 (1954).

5. The results have been the subjects of patents filed and accepted in foreign countries

The total number of patents taken from 1951 is 71. Of these, 33 have been accepted. U.K., U.S.A., France, Germany, Holland, Switzerland, Belgium, Cuba and Turkey are the countries in which patents have been filed.

6. Some of the processes developed have been appreciated by foreign organisations to the extent of their requesting that they may be furnished with the know-how.

Appreciations have been received from Fuel Research Station, U.K. and U.S. Bureau of Mines for the catalysts developed at the Central Fuel Research Institute for F.T. Synthesis and hydrogenation of coal and tar.

Research on ammonia-carbondioxide reaction on sea bittern and Phase rule study of Sambhar bittern. The appreciation of this work carried out at the Central Salt Research Institute has been generally for its value as fundamental research. The New Zealand Trade Commissioner was interested (1954) in asking for details on the first part.

Foam Glass: The process for the production of "Foam Glass" developed by the Central Glass and Ceramic Research Institute was appreciated by the Czechoslovakian Government and they wanted to acquire the technical 'know-how' of the process

A number of processes developed by the Laboratories of the Director of Scientific and Industrial Research during the last war, not only constituted a valuable contribution to the war effort but also, these processes have been made available for defence purposes to some foreign governments. In partial recognition of the work on vegetable oil lubricants carried out by the laboratories, the Burma Shell and Assam Oil Companies have instituted scholarships of the value of Rs. 2 lakhs a year.

As an appreciation of the Synthesis gas work carried out by the Fuel Research Institute, Messrs. H. Koppers of Germany have generously donated part of the Kopper-Totzek Coal gasification plant to the Institute.

7. Foreign research bodies have offered collaboration for joint investigations of the problems under study.

British Leather Manufacturers' Research Association, England is colloborating with the Central Leather Research Institute in regard to researches to solve curing and preservation problems.

8. The results have been taken into account for formulation of international standard specifications.

"The Fuel Research Institute has contributed to new methods of analysis of coals, particularly for nitrogen and phosphorus, and thereby to their international standardisation". (Second Reviewing Committee Report, p. 30).

9. The instruments and devices developed have been taken note of in foreign publications and it is not unlikely that some of them are being used also. In some cases, the techniques developed have been recommended for trial by foreign expert bodies.

Stabilization of soil with soft aggregates for road construction: a technique developed at the Central Road Research Institute has been recommended for trial in ECAFE countries by the Highway Sub-Committee of ECAFE Secretariat. A new 'liquid limit device' evolved in the Institute has been discussed in an American Society for Testing Material. The work on 'Timing of Signals for mixed slow and fast traffic' has received recognition from the Road Research Laboratory, England.

10. Eminent scientists who visited the national laboratories and closely studied their research programmes have recorded appreciative references.

"In remarkable contrast with the ultra-conservative methods employed for actual road construction in India, is the very keen interest in various aspects of modern highway engineering, and an eagerness to learn shown by many highway engineers in India. For example, the technical personnel of the C.R.R.I. at New Delhi are a very alert and exceptionally well informed group. They would be highly rated in any highway department in the world. This is very encouraging, for it is inevitable that this acquaintance with up-to-date construction methods employed elsewhere, will be reflected in time in new and improved approaches to highway construction in India".

11. The laboratories have been admitted to membership of international organisations and learned societies.

12. The outstanding research work of some of the members of the staff have led to their recognition as authorities in their field. They

have been invited to speak in international conferences and congresses on their subjects of investigation, elected in the executive board of their organisations and also invited as experts under Technical Aid Programmes.

Dr. K. S. Krishnan has been nominated Foreign Associate of the National Academy of Sciences, U.S.A

Dr. Lahiri, Chief Co-ordinator, nominated by the Commonwealth Specialists Committee for reviews on Coal constitution and direct use of coal for reduction of ores.

Dr. B. Mukerji, member of Editorial Board of the Journal of Medical and Pharmaceutical Chemistry.

Dr. K. S. G. Doss—National Secretary: International De Thermodynamique Et De Cinetique Electrochemiques.

Dr. A. P. Mitra—Chairmanship of the working Group in Data and Publication of the Committee on space Research (COSPAR) established by the International Council of Scientific Union (ICSO).

# APPENDIX XI

(Vide para 58)

List of National Laboratories/Institutes which have been recognised by Universities for post-graduate study and research

Sl. No.	Name of the Laboratory	Universities affording recogni- tion.
I	2	3
I	National Physical Laboratory, New Delhi.	<ol> <li>Andhre University.</li> <li>M. S. University of Baroda.</li> <li>Bombay University.</li> <li>Banaras Hindu University.</li> <li>Punjab University.</li> <li>Delhi University.</li> <li>Madras University.</li> <li>Agra University.</li> <li>Travancore University.</li> </ol>
* 2	Central Road Research Institute, New Delhi.	<ol> <li>Agra University.</li> <li>Andhra University.</li> <li>Madras University.</li> </ol>
3	Central Salt Research Institute, Bhavnagar.	<ol> <li>Bombay University.</li> <li>Karnatak University, Dharwar.</li> </ol>
4	Central Drug Research Institute, Lucknow.	<ol> <li>Agra University.</li> <li>Aligarh University.</li> <li>Andhra University.</li> <li>Bombay University.</li> <li>Calcutta University.</li> <li>Madras University</li> <li>Poona University.</li> <li>Panjab University.</li> <li>Vikram University, Ujjain.</li> </ol>
5	Central Building Research Insti- tute, Roorkee.	1. Bombay University. 2. Poona University.
6	Central Electro-Chemical Re - search Institute, Karaikudi.	<ol> <li>Agra University.</li> <li>Andhra University.</li> <li>Bombay University.</li> <li>Karnatak University.</li> </ol>

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1	2	3
7	Central Leather Research Insti- tute, Madras.	<ol> <li>Madras University.</li> <li>Karnatak University.</li> <li>Rajasthan University.</li> </ol>
8	National Metallurgical Labora- tory, Jamshedpur.	<ol> <li>Agra University.</li> <li>Andhra University.</li> <li>Bombay University.</li> <li>Madras University.</li> <li>Banaras Hindu University.</li> </ol>
9	Central Fuel Research Institute, Jealgora.	<ol> <li>Agra University.</li> <li>Andhra University.</li> <li>Aligarh University.</li> <li>Baroda University.</li> <li>Bombay University.</li> <li>Kerala University.</li> </ol>
10	Central Glass & Ceramic Re- search Institute, Calcutta	<ol> <li>Agra University.</li> <li>Andhra University.</li> <li>Banaras University.</li> <li>Calcutta University.</li> <li>(Although formal recogn ition has not been received but two research workers of the Insti tute have enrolled themselves with Calcutta University for Ph. D. degrees.)</li> </ol>
11	Central Food Technological Research Institute, Mysore	<ol> <li>Punjab University.</li> <li>Nagpur University.</li> <li>Bombay University.</li> <li>Madras University.</li> <li>Poona University.</li> </ol>
12	Regional Research Labor atory, Hyderabad.	<ol> <li>Osmania University, Hydera- b ad.</li> <li>Andhra University, Waltair.</li> <li>Poona University.</li> <li>Keraja University, Trivan- drum.</li> <li>Muslim University, Aligarh.</li> <li>Banaras Hindu University, Varanasi.</li> <li>Calcutta University, Nagpur.</li> </ol>
13	National Botanic Gardens, Luck- now.	1. Agra University. 2. Karnatak University

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<sup>2.</sup> Karnatak University.

I	2	3	
14	National Chemical Laboratory, Poona.	<ol> <li>Madras University.</li> <li>Poona University.</li> <li>Bombay University.</li> <li>Agra University.</li> </ol>	
15	Indian Institute for Biochemis- try and Experimental Medi- cine, Calcutta.	1. Calcutta University.	

### APPENDIX XII

(Vide para 61)

Statement showing number of research fellowships awarded in the National Laboratories/Institutes from 1956-57 to 1959-60

S. No.	Name of the Laboratory	195	6-57	19	957-1	58	1958	-59	1959	-60
		*SRF	*JRF	SR	F JF	RF S	SRF	JRF	SRF	JRF
I	National Physical Laborat	ory,	•							
	New Delhi	•	I	3	3	4	4	I	4	3
2	C.R.R.I., New Delhi		••	• •	(1	;)	(	3)	(	2)
3	N.M.L. Jamshedpur	•	(2)	)	2		I		3	2
4	N.C.L. Poona	-	(2)		т	ç	£	тS	~	<b>7 9</b>
4 5	C.F.R.L. Jealgora	•	100	т	1	2	2	2	2	10
6	C.G.C.R.I. Calcutta		-						ر	T
7	C.L.R.I., Madras		I	I			I	3	2	Ť
8	C.D.R.I., Lucknow				2	2	2	3	ī	7
9	C.F.T.R.I., Mysore		I	I	3	4	3	9	· 3	ó
10	C.E.C.R.I., Karaikudi		••							á
11	C.B.R.I., Roorkee		••	• •	• •	4	2	4	• •	2
12	C.S.R.I., Bhavnagar	•	• •	• •	••	•••	••	••	• •	••
13	N.B.G., Lucknow	•							(	8)
14	C.E.E.R.I., Pilani							• •	`	-,
15	C.M.R.S., Dhanbad	• •			••	••	••	••	••	3
16	R.R.L., Hyderabad .				(;	2)	(1	2)	(1	<u>s)</u>
17	I.I.B.&E.M., Calcutta		• •		2`	ÍΙ	2	_, 	4	<u>ح</u>
18	B.I.&T.M., Calcutta		• •				••			
19	C.M.E.R.I., Durgapur				• •				• •	
20	R.R.L., Jammu-Tawi			••	••		••	3		• •
21	C.P.H.E.R.I., Nagpur		• •	··.	• •		• •	•••		
22	N.A.R.L., Bangalore		•••	• •	• •	••	• •		• •	•••
23	CIMPO	• •	Nil		N	lil	1	Jil	. 1	Jil
24	R.R.L., Assam .	• •	Nil		N	Jil	1	Nil	1	Jil

\*S.R.F. stands for Senior Research Fellow. J.R.F. stands for Junior Research Fellow.

XII	
APPENDIX	

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(Vide para 66)

Statement showing the Pilot Plants set up at the National Laboratories/Institutes

<ul> <li>The date from which a full plant has been started on the basis of the results achieved by the Pilot Plant</li> </ul>	و	CALCUTTA Process assigned to M Blue Star Engineeri Co. Ltd., Bombay, September, 1958 ar they are taking ste to put up the plant.
Expenditure ir curred on each Pilot Plant (upto 31st March, 195	Ś	CH INSTITUTE, C Rs. 48,000
Date of its closing down where the Pilot Plant trials have been com- pleted	4	CERAMIC RESEAR
Month & Year in which it started func- tioning	£	CENTRAL GLASS AND May, 1955 .
Name of the Pilot Plant	8	I. Pilot Plant for production of Foam Glass.
No.	I	щ

The production plant is scheduled to start func- tioning at the Institute by the end of this year.		Design data for a commer- cial scale LTC for the production of do- mestic coke will be ob- tained from the LTC Pilot Plant now being installed.	H.T.C. Plant is being used for the choice of suitable blends of coal to be used in the coke- ovens of the new steel plants.		Coal Washing plant has been utilized for draw- ing up the specifications for calling tenders for the central washeries.
Rs. 1,97,000	UTE, JEALGORA	Rs. 3.80 lakhs	. Rs. 6.00 lakhs	<ul> <li>Rs. 1.767 lakhs</li> <li>(Donated by M/s. Hindustan Steel Ltd.)</li> </ul>	Rs. 20·931 lakhs
start of this	IEL RESEARCH INSTITU	· Š	In operation	In operation	In operation
Expected to by the end year.	II. CENTRAL F	Starting short	February, 1957	June, 1959	June, 1959
Pilot Plant for production of Optical Glass.	1	Low Temperature Carboni- sation Plant.	High Tempcrature Carboni- sation Plant.	Koppers Totzek Gasifi- cation Plant.	Coal Washing Plant (Heavy Medium and Jig).
4		4	2	m	4

9				N.B :
S	Rs. o·780 lakhs.	Rs. 0·310 lakhs.	In InC. WeX.	Rs. 25,000/-
* , 4	In operation.	In operation .		August, 59
m	August, 1959	March, 1957.	III. CENTRAJ R	18-3-57
(1	L.P. Briquetting Plant	Pilot Plant for devolatili- sation of coal for pre- paration of domestic coke by Chaingrate Stroker.	In addition, the Institute has installed a number of Semi-Pilot Plants, i.e., Fischer Tropsch, Synthesis, Tar Hydro- genation, Phthalic An- hydried, Washing of coal by cyclone, Froth Flotation, 50 lbs./hr. Down Draft Gasification, Coal Oxidation and preparation of fertili- zers from coal, Drying of lignite and fluidised Carbonisation and high temperature electrically heated carbonisation plant (Swoboda-Oven)	Construction of low cost stabilized soil Roads,
-	×	ø		. 🛏

being prepared in the States of Rajasthan, Bombav. Mahdva Pra-	Pradesh and Bihar.		These are partly to be financed by the Govern- ment of India.				These are partly to be financed by the Govern- ment of India.	
	Rs. 25,000/-	, 	Advance of funds has been made to these States and	only on completion of work the ex- penditure will be known.			Advance of funds has been made to these States and only on completion	
	July, 1959 .	In Progress	Do.	Do.	Do.	Do.	ě	
	18-3-57	18-3-57	18-3-57	18-3-57	18-3-57	18-3-57	18-3-57	
Sriganga Nagar, Rajas- than.	2 Construction of low cost stabilized soil Roads, Basantpur, Bihar.	3 Construction of low cost stabilized soil Roads, Agartala, Tripura	Construction of low cost stabilised soil Roads, Puri, Orissa.	5 Construction of low cost stabilised soil Roads, Bodra, West Bengal.	6 Construction of low cost stabilized soil Roads, Prantij, Bombay.	7 Construction of low cost stabilised soil Roads, Lucknow, U.P.	8 Construction of low cost stabilized soil Roads, Ramnad, Madras.	

6	he iil		The Block Development Officer of that area has reported to the Develop- ment Commissioner, Delhi that experiment has been very success- ful and may be tried on a larger scale.	te, Nagpur	Demonstration Plant.		
~ (	of the work, t expenditure w be known.	Rs. 26,000/-	Rs. 400/-	RESEARCH INSTITU	Rs. 15,000	fory, Poona	Rs. 790.00
4		june, 1959	August, 1959.	ealth Engineering	Continuing	CHEMICAL LABORAT	Continuing
£		1 <sup>8-3-57</sup>	December, 1958	BNTRAL PUBLIC HI	June, 1959	V. NATIONAL	January, 1959
2		Construction of low cost stabilized soil Roads, Gwalior, Madhya Pra- desh.	Pilot Plant on the use of Water Proof Mud Plaster in the Community De- velopment Projects, Village Kanjawala in Delhi.	IV. C	Demonstration Plant- Chandrawal Water Works, Delhi for water treatment.		Extraction of wax from sisal waste.
I		Q,	01		T		I

			<b>58</b>					-
Rs. 1960-31	Rs. 5598 · 54	Rs. 7261 · 02	Rs. 1,04,889 <sup>.</sup>	Rs. 3,079·43	Rs. 8,906·35	Rs. 74,376 • 7 <u>5</u>	Rs. 34,419.95	Rs. 15,726 92
Do.	Do.	Do.	Do.	Continuing	Do.	Do.	June, 1959	February, 1959
June, 1958.	May, 1958	June, 1959	August, 1958	December, 1958.	June, 1958.	January. 1957	April, 1958.	January, 1958.
Refining of Nim and other inedible Oils.	Chemical modification of sugar-cane wax.	Synthesis of Pyridoxine Hydrochloride (Vitamin B)	Utilization of indigenous cellulosic raw materials for the production of Rayon Grade Pulp.	Carbon tetrachloride and chloroform from sewage gas, methane and chlo- rine.	Hexachloro-ethane from ethylene and chlorine.	Polyvinyl chloride from alcohol and chlorine.	Extraction of Costus Root Oil.	Preparation of civetone and dihydrocivetone.
. 11	ŝ	4	Ś	Q	7	œ	6	10

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9								
5	Started recently.	Rs. 890 <sup>.</sup> 12	Rs. 6,045 44	Rs. 24,403 · 75	Rs. 41,388 • 18	. Rs. 22,251 · 82	Started recently.	<b>~</b>
4	Continuing	Do.	April, 1959	. April, 1958	. December, 58	Continuing	Continuing	June, 1952
Э	August, 1959	July, 1959.	April, 1958	September, 1956	November, 1957	April, 1958	August, 1958.	November, 1951
2	Synthesis of exaltone and exaltolide using mus- tard oil as raw material.	Synthesis of dihydrojas- mone and dihydrojas- jasmone using chemicals derived from castor oil.	Bacterial diastase	Synthesis of Vitamin 'C'	Gelatine as a plasma substi- tute.	Preparation of cation ex- change resin from com- mercial cashewnut shell liquid.	Thermisters .	Gelatine .
н	II	12	13	14	13	16	11	18

19 20	Nicotine sulphate— (i) First Process (ii) Second Process	September, 1951 January, 1955	February, 1952	Figures of expenditure not available as no separate accounts were kept.
31	Dicalcium Phosphate .	January, 1951 .	June, 1952	
32	Chlorination of rubb <del>e</del> r	December, 1951	December, 1952	
		VI. CENTRAL SALI	r Research Instit	jte, Bhavnagar
I	Sambhar Bitterns	1957-58	1959-60	ks. 35,000 00 Approx.
6	Dairy Salt	1958-59	Continuing	8s.40,000.00 Approx.
	ν	II. CBNTRAL BUILDIN	G RESEARCH INSTIT	utr, Roorkee
	In view of the nature of following are bei	the work, no Pilot Plant ing carried out :	t has been erected by	the Institute though field trials on the
	(i) Bricks from bla Black Cotton	ick cotton Soil, ( <i>ii</i> ) Nc soil.	m-erodable mud pl	aster , and (iii) Pile Foundations on
		/III. CENTRAL LEATHI	BR RESEARCH INSTIT	ute, Madras
1	Production of fat liquors	· 1956-57	Continuing	Rs. 0. 74 lakhs. The processes for the
				production of sulphated pungam and fish oils have been leased out by the NRDC and the

-	2	3	4	S	Q
}			•		party is engaged in sec- uring the equipment and machinery for the plant.
2	Leather Adhesives	1958	Continuing	Rs. 0·005 lakhs.	Process has not yet been leased out.
ŝ	Tannin Extract	Plant not yet started functioning.	Does not arise.	Rs. 0.062 lakhs.	
4	Manuíacture of Bates	Do.	Do.	Rs. 0·072 lakhs.	
~	Leather pigments (finishes)	Do.	Do.	Rs. 0 008 lakhs.	
Ŷ	Hide Powder. (b) Basic Alunimium Sulphate (c) Cationic Emulsifier, (d) Curing Salts. (e) Syntans.	Production limited to the requirements of the Laboratory.	Continuing	Rs. 0·009 lakhs.	Basic Aluminium Sul- phate and curing salts have been released to the trade.
r.	Leather Polishes	Production limited to the requirements of the Laboratory.		Not available.	
00	Leather Boards	October, 1958	Çontinuing	Rs. 0 035 lakhs,	The costing and other non-technical details of the process forwarded

to Liaison Officers and other organisations for leasing out the pro- cess.		Economics of production	are being worked out.					
,	Rs 0.020 lakhs.	Rs o.oor lakhs.	TORY, JAMSHEDPUR	Rs. 27 00 lakhs	Rs. 30,000	Rs. 15,000	An expenditure of Rs. 5.32 lakhs is estimated for the 2nd Plan period.	An expenditure of 7.55 lakhs is estimated for the 2nd Plan period.
	Continuing .	Do	etallurgical Labora	Continuing	Do.	Do.	Does not arise.	Do.
	Not available	March, 1959	. NATIONAL M	5-2-1959	Early 1955.	1957	Being installed.	ģ
	Large Scale Tannery Trails	Synthetic Leather Oils	XI	Low Shaft Furnace Pilot Plant.	Semi Pilot Plant for the production of Electroly- tic Manganese.	Semi Pilot Plant for the production of Electroly- tic Manganese Dia- oxide.	Pilot Plant Studies on the Beneficiation of low-grade Manganese, Chromite and other ores.	P.P. for Thermal benefica- tion of Ferruginous Managenese Ore and Low grade Chromite Ore.
	0	0 I		I	2	m í	4	s

9									*This amount constitutes estimated cost of the	plant.
5	An expenditure of Rs. 4.83 lakhs is estimated for the 2nd Plan period.	An expenditure of Rs. 6.57 lakhs is estimated for the 2nd Plan period.	Hyderabad-Dn. 9.	Rs. 1,10,961.	Rs. 1,36,230	Rs. 38,057	Rs. 23,120	Rs. 1,799	Rs. 1,18,146 *	Rs. 5,39,896*
4	Does not arise	Do.	rch Laboratory, 1	Continuing	Ď	Do	March, 1959	Continuing	Do	Å
<b>e</b>	Being installed.	Do.	K.—Regional Resear	November, 1953	1957	April, 1957	January, 1958	April, 1958	January, 1959	Under erection
R	P.P. for the Hot Dip Alu- minising of Steel Sheets and Wires.	P.P. for production of Re- fractories	~	Hand-made Paper	Active Carbon Grade I.	Active Carbon Grade II	Dehydrated Caster Oil	Levulinic Acid and Calcium Levulinate	Distillation of L.T. Tar	Fat Splitting and Fatty Acid distillation
-	v	7		I	6	ŝ	4	Ś	Ŷ	7

						Plant is a demonstration- cum production unit. The Kerala Govern- ment has decided to instal a 20 ton plant for popularising the product. Rs. 4.615 lakhs.	Affunit for the production of 10 tons per day of the Indian Multi-purpose Food is being installed by the Government of
Rs. 22,408	Rs. 2,32,920	Rs. 971	Rs. 731	Rs. 19,86,326	ch Institute, Mysore.	Rs. 3,389 40 Rs. 10,916 28 Rs. 198,428 12 Rs. 65,056 97 Rs. 84,353 01 Rs. 84,353 01	Ra. 185,000
. Continuing	Do.	Do.	Do.	Do.	HNOLOGICAL RESEARC	In operation	Do.
December, 1957	1954	September, 1958	December, 1958	January, 1954	ENTRAL FOOD TEC	May, 1953 1954-55 1955-56 1956-57 1957-58 1958-59	j July, 1957
Chlorinated Turpentine .	Cotton seed processing, and refining of cotton seed oil.	Preparation of Pyrometric Cones.	Preparation of Sulphur from gypsum.	Low Temperature carboni- sation of coal.	XIC	Synthetic Rice Project	Multi-purpose Food Project]
œ	6	10	11	12		I	6
195	9 ( <b>A</b> ii) I	LS—7			15	<b>F</b> *	

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				92	2.				
	9	Madras in co-operation with UNICEF.	*A unit for the produc- tion of vegetable curd is functioning in the Ramakrishna Vidya- laya, Perianaicken- palayam near Coim- batore.		From 1959, production on a commercial scale started.				
	S		*Not available	IV, NEW DELHI	Rs. 5,42,917	Rs. 1,975	Rs. 1,953	Rs. 1,26,192	
*	, 4		In operation	IYSICAL LABORATOR	Continuing	Do	Do.	Do.	
	£		October, 1951	XIINATIONAL PI	April, 1955	March, 1958	November, 1958'	July, 1956	And a state of the
	R		Vegetable Curd		Ceramic Capacitors •	Carbon Electrodes .	Magnetic Fluid for Crack detection.	Glass Blowing .	and the second
	г		m		г	, 14	ŝ	4	

# APPENDIX XIV

# (Vide para 68)

# List of processes released by the Council

.Pr	ocesses released against premium and royalty I	Pro	Processes released free to Industry				
<u></u>	1941		1941 to 1953				
Ι.	Bhilawan stoving enamels & allied products. (Patent No. 28002 to 28005, 20028)	Ι.	Manufacture of Antigas Cloth.				
2.	Class Substitutes.	2.	Use of Vegetable oil Blends as Lubricants.				
3.	Laminated Paper Fibre Boards.	3.	Manufacture of Bamboo Gramophone Needles.				
4∙	Luminous Paints & Pigments.	<b>4</b> .	Manufacture of Coffee Husk Plastics.				
5.	Oil Silks.	5.	Fertilizers from Phosphatic Nodules.				
6.	Silver Paper & Glossy Transparent paper.	6.	Manufacture of Urea.				
7.	Solid Fuel.	7.	Manufacture of Mosqu ito-				
8.	Treatment of Manganese Ores for Dry Cell Manufacture.	8.	Signal Smokes & Flares.				
*9.	Waterproof Paint for Indianite Roofing Slabs.	9.	Manufacture of Enterovio- form.				
<b>*</b> 10.	Steamproof Plastics.	10.	Purification of Indian Glass Sands.				
1.	Air Foam Solution.	11. 12.	Manufacture of Agar Agar. Standardized Filter Papers for				
<b>*</b> 2.	Identity Discs.	13.	Gas Purity Tests. Bamboo Strips for Weaving				
<b>@</b> 3.	Potassium Chlorate.	т <u>л</u>	Combs. Capping Cement for Electric				
4.	Stearic and Oleic Acids.	-4·	Bulbs.				
5٠	Cork Substitutes.	15. 16.	Manufacture of Wet-Ground				
6.	Formaldehyde.		MICA FOWDEL.				

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- Plastic Collapsible Tubes. \*ı.
- Small Carbon Electrodes. 2.
- Barium chloride. 3.
- 4. Petrol Pump Diaphragms.
- 5. Indigenous Moulding Powders.

\*6. Atoxyl and Carbarsone.

\*7. Pyrethrum Emulsifier. Resin & Plastic Dopes. 8.

#### 1944

- \*I. Vacuum Pumps.
- \*2. Dye Extracts & Dyed Shades on wood from Tamarind Seed Tests.
  - Annatto Dye Extracts. @3.
    - Dettol type disinfactants. 4.
    - Crown Cork Cement. 5. \*6
    - Dye extracts & dyed Shades on wool etc.

#### 1945

- \*I. Resin impregnation of Jute Mill Bobbins.
- \*2. Extraction of Potash Salts from Molasses.
- Calcium Gluconate. 3.
- **\***4. Carbon & Graphite Electrodes.
- 5. 6. Tin-lining Compounds.
- Fluids used in hydraulic machines

#### 1946

- Ι. Jute Boards.
- Ebonite Substitutes & other hard **\***2. & soft rubber goods from rubber waste.

- Extraction of Orange Oil. 17.
- Manufacture of Pure Common 18. Salt.
- Aqueous Extraction of oil from 19. Castorseed.
- Saponin free soapnuts. 20.

### Processes Transferred to Supply Development Committee, Royal Air Force, etc., for Development.

- High Tension Ignition Cable Ι. Testing Device for Field Use.
- Slushing Varnishes for Metal 2. Tanks for Petrol Storage, and for Rubber, Synthetic Rubber and Laminated Tanks for carrying Petrol in Aircraft.
- Patching Cement for Repairing 3. Rubber and Synthetic Rubber Tanks.
- Petrol-proof Hose-pipes. 4.
- Petrol Pump Diaphragms Proof against Petrol, Alcohol 5. and Mixtures.
- Petrol Tank Sealing Composi-6. tion.
- 7. Smoke Candles and Distress Signals for Use in Land and Aerial Operations.
- Reclamation and Use of Pers-8. pex.
- Non-inflammable Water Resis-9. tant Cloth.
- Substitute Hairlock. 10.
- 11. Improved Hot Food Containers.
- Furfurol. 12.
- Plastic Collapsible Tubes. 13.
- Lubricants fromVegetable Oils 14. and Vegetable Oil-mineral Oil Blends.
- Carbon Electrodes for Dry 15. Cells Arc Lamps and Arc Welding.

	<u>9</u> 5		
	I		2
<u></u>	1947	16.	Tin Lining and Seaming Com- pound.
1.	Dipped Latex Goods.	1.7. 18.	Water Detecting Composition Pyrethrum Gream.
	1948	19.	Manufacture of Pyrethrum Emulsifier.
1.	Rubberless Armoured Hose Pipes.	20.	Thickened Fuel for Flame Throwers and Incendiary
*-	1949 Sinteend Class Eiltern	,	Domos.
<b>™1.</b>	Sintered Glass Filters.	21.	Ann-gas Cloth.
*2.	1952	22.	Reducing the Vapour Lock Tendency.
1.	Solar Cooker (Patent No. 46981) 1953	23. 24.	Cellulose Dopes. Clay Pigeons.
1.	Groundnut milk curd (Pat. No. 47902).	25.	Hydraulic Brake Fluid.
2.	Pristemerin & Dulcitol (Pat. No. 40968, 40969 & 40970).		
3.	Thermo-couple Ammeters.		
<b>4</b> .	Adhesive Tape-cello tape type.		
	1954		
1.	Carbon Slab & Rod Material for brushes (Non Patented).		
	Year ending 31st March, 1955		Released Free
i.	Manufacture of Carbions from Indian Coals. (Patent No. 47446).	1.	Recovery of Nickel and Fat from spent hydrogenation cata- lyst of Vanaspati factories (Non-Patented).
2.	Nicotine sulphate from tobacco and tobacco wastes. (Patent No. 45666 & 54867).	2.	Myrobalam Extract in the myrobing of East Indian Tannage of skins and kips (Non-patented).
3∙ 4∙	Ginger Cocktail (Non-Patented). Tonic Wine. (Non-Patented).		

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#### Year ending 31st March, 1956

- 1. Citric Acid. (Non-Patented).
- Enamels for wire wound resistors (Patent No. 48419, 49425 and 52111).
   Mica Insulating Bricks-Patent
- 3. Mica Insulating Bricks-Patent No. 48667 and 55559).
- Negotiations for the licensing of CSIR's patents on 'Carbions' in Western Europe (other than U.K.) were completed. No. C10 359 W b/12.

Year ending 31st March, 1957

- 1. Chemical Porcelain (Non-Patented).
- 2. Desiccants and dehumidifiers from Indian Coals (Karbogel). (Patent No. 54264).
- 3. A development licence agreement has been negotiated with Atul products Ltd., Atul, according to which the firm will at their own cost, undertake detailed investigations for he design and fabrication of a large scale plant for production of Benzidine, according to the researches conducted under the aegis of CSIR some years back. Benzidine is an important dyestuff intermediate. (Pat. No. 32486).

Year ending 31st March, 1958

- 1. Lisasorb. (Patent No. 53607).
- Cashew kernels-improvements in storage life (Pat. No. 49838 & 53319).

- 1. Di-calcium phosphate. (Nonpatented).
- 2. Copper Ruby Glass (Pat. No. 51847).
- 3. Fruit Toffees—A new fruit confecton-Patent No. 50805.
- Recovery of Chrome from Chrome Liquors. (nonpatented).
- 5. Manufacture of Picking Bands (Patent No. 44485).
- 6. A process for arresting the fermentation of Vegetable Tan Liquors—Patent No. 55768.
- 7. Manufacture of unadulterated East. India Tanned leathers Patent No. 53270.
- 8. Anodising & Dyeing of Aluminium. (non-patented).
- 9. Recovering of sugar from sugarcane Bagasse (non-patented).
  - 1. A cement composition for jointing safety base cinematographic films Patent No. 52028.

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- 3. Ethylether (Patent No. 49836).
- 4. Manufacture of cheap brade paper from bamboo. Patent No. 49054 & 57267.
- 5. Brick & block-making machine. Patent No. 55602.
- 6. New Foaming Agents for production of low density foamed concrete (Patent No. 58909).
- 7. Ethylene dichloride (Pat. No. 91958 & 56935).
- 8. Malted milk and allied products. Patent No. 46995.
- 9. Active Dry Baker's Yeast. (Non-Patented).
- 10. Fruit Juice Powder. (Patent No. 49590).
- 11. Composite protein food. Patent No. 47580.
- 12. Ceramic capacitors. Patent No. 53462, 53372, 53608 and 54263.
- 13. Electrolytic cuprous oxide. Patent No. 52394 and 56532.

- 2. Composition for preparing cyclindrical rolls from washed safety base cinematographic films. Patent No. 52027.
- 3. Improvements in or relating to Metallisation of non-conductors—Patent No. 45579.
- 4. Electroplating of metals on aluminium or its alloys— (Patent No. 51524).
- 5. Improvement in or relating to Brass Plating—Patent No. 45565.
- 6. Chemical polishing of aluminium Patent No. 47401.
- 7. Ceramic colours & Glazes. (non-patented).
- 8. Edible Flour from groundnut cakes. (Non-Patented).
- 9. An improved process for making bricks from sticky clays-Patent No. 59630.
- 10. Synthetic tanning materials Patent No. 50804.
- Preparation of synthetic tanning materials from phenolic bodies Patent No. 52835.)
- 12. Synthetic tanning materials— Patent No. 53651—53653.
- Improvements in or relating to woollen fabrics—Pat. No. 54040.
- Manufacture of Basic Aluminium chloride —Pat. No. 53198. (Substitute of 50873).
- Manufacture of Chrome vegetable tanning extracts—Pat. No. 51250.
- 16. Preparation of Synthetic tanning materials from gas tar—Patent No. 52657.
- 17. Modification of the above process Patent Nos. 52705 to 52709.

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18.	Perparation of synthetic tan- ning materials from Rosin. Patent No. 53637.
19.	Preparation of white tanned snake skins—Patent No.
20.	Manufacture of picking Band Leather—Patent No. 51201.
21.	Manufacture of upholstery leather Patent No. 53196.
22.	Treatment of vegetable tan liquor—Patent No. 52834.
23.	Manufacture of basic alu- minium chloride—Patent No. 59607.
24.	Manufacture of gold and silver leather—Patent No. 55818 & 55819.
25.	Improvements in or relating to leather manufacture— Patent No. 53798.
26.	Leather tanning with Chrome Aluminium tanned extract— Patent No. 50782.
27.	Synthetic tanning materials— Patent No. 52798 and 52799.
28.	Synthetic tanning materials— Patent Nos. 50863, 52798 & 52799.
29.	Preparation of basic alu- minium sulphate for use as tanning salt or in dyeing or the like—Patent No. 47597.
30.	A process for the production of improved tan liquors from vegetable tan stuffs—Patent No. 49815.
31.	Groundnut milk curds. Patent No. 47902.
32.	Manufacture of ensecticide formula (Non-Patented).
33.	Manufacture of table salt— Patent No. 60556 (to Salt Commissioner).
34.	Signal glasses and lenses. (Non-Patented).

# Year ending **31st** March, 1959

- I. Infant foods (non-Patented).
- 2. Sealing device for containers— Patent Nos. 58085 and 58382).
- 3. Liquid Rubber (Patent No. 60555)
- 4. Boron Free Enamels (Patent Nos. 49555 and 54394).
- 5. Foam glass. Patent No. 49524.
- 6. C.M.C. Technical Grade Sodium carboxymethyl cellulose). Patent No. 62751.
- %7. Vitamin C. (Ascorbic Acid) Non-Patented.
  - 8. Improved Graphite Crucibles Carbon bonded) Patent No. 58669.
  - 9. Dehydrated caster oil--Patent No. 46457 and 55423.
  - Manufacture of duplicating, printing and allied inks. Patent No. 40257.
  - Manufacture of doubly curved shell elements for roofs, floors and panel walls—Patent No. 61645.
  - 12. Shrifirst compounds—Patent Nos. 65282 and 59835.
  - Stabace (Stable Bath Catalyst) Patent No 62939.
  - Silver Mica Capacitors—Patent No. 53528.
  - 15. Wet ground mica--Patent No. 55454.
  - 16. Copper enamels—Patent No. 54433.

After 31st March, 1959

- 1. Can Sealing composition. Patent No. 66194.
- 2. Pressure sensitive Adhesive Tape-Patent Nos. 66803 and 67490.

- 35. Use of sodium sulphate in the manufacture of certain types of glass in place of soda ash. (Non-Patented).
  - 1. Concentrated nutritionally balanced foods (non-patented).
  - 2. Mango cereal flakes (nonpatented).
  - 3. A process for the enzymic unhairing of Skins & Hides— Patent No. 52013.
- 4. An improved process for the enzymic unhairing of Skins and Hides—Patent No. 50806.
- 5. A curing agent for raw hides and skins—Patent No. 56251.
- 6. A new curing agent for wet salting of hides and skins. Patent No. 58886.
- 7. Improved container for Bulk packaging (non-Patented).
- 8. Improvement in the manufacture of Fruit pulps in form of Sheets Slabs or the like— Patent No. 49441.

- 1. Foundry core oil—Patent No 65542.
- 2. Retarder for Gypsum Plaster. (Non-Patented).

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3.	Improved Mullite Refractories from kyanite—Patent No. 58553.	3. Construction of Flat or Arched roofs or like structures— Patent No. 54361.
<b>.4</b> .	Resins from Tar Oil fractions— Patent No. 56581.	•
5.	A Portable Under Reaming Tool-Patent No. 54907.	
<i>'</i> 6.	Manufacture of Nickel Free Stain- less Steel—Patent Nos. 61978, 61979 and 61980 (To be exploit- ed in Public Sector).	

\*Processes were leased out, but did not go into production due to certain difficulties or lack of demand.

@Processes released free.

%Final acceptance of the terms by the lessee firm still awaited.

# APPENDIX XV

# (Vide para 69)

Names of processes lincensed out and in commercial production indicating the year in which a particular process was released as also the year in which production started

Name of the process	Year in which process started	Year in which production started
I. Manufacture of nicotine sulphate from tobacco and tobacco waste—Patent No. 54666 and 45867.	1954-55	1959
2. Solar Cooker—Patent No. 46981	1952	1953
3. Composite Protein Food-Patent No. 47580	1957-58	1959
4. Mica Insulating Bricks, Patent No. 48667	1955-56	1958
5. Manufacture of carbions from Indian coals— Patent No. 47446	1954-55	1956
6. Lisasorb-Patent No. 53607	1957-58	1 <b>95</b> 8
7. Preparation of new foaming agents—Patent No. 58909	1957-58	1959
8. Bhilawan stoving enamels—Patent Nos. 28002, 28003, 28004, 28005 and 29938	1941	1943
9. Manufacture of Pristemerin and Dulcitol Patent Nos. 40969 and 40970	1953	1957
10. Production of carbon slab and rod material used for making brushes for electrical machinery	1954	1958-59
11. Manufacture of Ginger Cocktail          11. (a) Tonic Wine	1 <b>954-5</b> 5	1955-56
12. Enamels for wire-wound resistors—Patent Nos. 48419, 49425 and 52111	1955-56	1959
13. Chemical Procelain	1956-57	1957
14. Brick and Block making machine—Patent No. 55602	1957-58	19 <b>59</b>
15. Thermo-couple ammeters	1953	1955 <b>-56</b>
16. Under Reaming Tool	: <b>195</b> 9	1959
17. Silver Mica Capacitors	ì958-59	1959

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APPENDIX XVI	ee for Scientific Research and Industry and	Action taken	4	A Sub-Committee to consider this problem was set up. It submitted a project report with cost estimates and other details on the manufacture of sulphur from gypsum and pyrites. The project report was consi- dered at the second meeting of the Joint Standing Committee. As the National Industrial Development Corporation	had already decided to put up a plant for the production of Sulphuric Acid from pyrites, it was not considered necessary for the C.S.I.R. to put up a plant for the purpose. It was decided that the Council of Scientific and Industrial Research
	(Vide Para 74) ations made by the Joint Standing Committe action taken thereon	Recommendation made	m	Sulphur Problem As there was no sulphur in India, it was recommended that efforts should be made to save this strategic material wherever possible and to produce sulphur from indigenous resources so as to make the country less de- pendent on sulphur imports.	It was recommended that a complete pyrite burning equipment should be set up in one of the Sulphuric Acid manufacturing units in the country as a developmental project under C.S.I.R.
	Statement showing certain recommend	Reference to meeting of the Joint Standing Committee	N	First meeting- held on 26th Feb- ruary, 1957.	Second meeting—held on 6th July, 1957.
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The Governing Body of the Council of Scientific and Industrial Research consi- dered this matter again at the meeting held on 23-3-1958. It was suggested that the Director General, Scientific and In- dustrial Research, might consult the Minis- try of Commerce and Industry as a pro- pect report in this connection submitted by the National Council of Applied Econo- mic Research to the Government of Bihar was under consideration of that Ministry. A further note on possibilities of recovery of sulphur from Amjor pyrites prepared by Dr. G.P. Kane was considered at the sixth meeting of the Joint Standing Com- mittee held on 13-11-1958 and as decided by the Joint Committee the note was sent to Shri J. J. Ghandy, Chairman of the Bihar Industrial Council. Now that an undertaking - Amjor Pyrites Ltd. has been established in the Public Sector, this project will be dealt with by them.		No research work was involved as it was essentially a utilization problem. A Sub- Committee was constituted to examine
A note on man ure of sulphuric acid from gypsum and pyrites pre- pared by the Ministry of Commerce and Industry was considered and it was decided :	Utilisation of Bones	Economic utilisation of bones for manu- fcture of fertilizers was recommended.
Fifth meeting—held on 10th Feb ruary, 1958.		Second meeting-held on 6th July, 1957.

would give only such technical assistance as may be necessary. 103

C
2	the q Comr Sent Minis	ting—held on 13th In order to promote export of bone The M products to earn foreign exchange, did na a sub-committee consisting of D.G. thougl S.I.R., Lala Shri Ram and Dr. G. P. countr Kane was constituted to meet and discuss the problems regarding that th possibilities of declaring bone meal would free for export with the Minister for vernm Food and Agriculture, so that it may bones.	Recovery of Sodium Sulphate from Salt Bitterns	eting—held on 6th Setting up of a pilot plant (10 tons per The Go Octob 7. a-ten Salt F Frecove The
8		Sixth meeting—held of November, 1958.		Second meeting—held o July, 1957.

\*

<ul> <li>6th It was recommended that in fu agreements executed by Nationa search Development Corpors with foreign firms exploiting Or and other processes, should inc an enabling clause dealing fixation of price.</li> <li>7 able Salt</li> <li>7 Pilot plant for manufacture of a salt from sea salt and vacuum evapora to open pan and vacuum evapora at Central Salt Research Insti Bhavnagar.</li> </ul>	
6th 12th	
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no n	
Second meeting—held July, 1957. Third meeting—held November, 1957.	

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1959-60 (so far)	ع		99	11	A brochure describing the research achievements of C.G.C.R.I. was pub- lished and was distri-
1958-59	S	CALCUTTA	20	15	
1957-58	4	amic Research Institute,	21	Ś	
1956-57	£	GLASS & CER	29	m	•
Work done	2	I	Number of Scientific papers published in C.G.C.R.I. Journal	Articles published in news- papers, trade magazines, Scientific/Technical Jour- nals and other tech- nical journals	Special Brochures and Tech- nical Publications
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APPENDIX XVII

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buted to public, Cham- bers of <b>Commerce and</b> Industry, members of Legislative Assembly, Universities and Re- search Centres. A monographPartl of the Indian Clayswas pub- lished which incorpo- rates researches carried out.	Above 350	ſ	<ul> <li>(i) Development exhibi- tion organised at Rana- ghat (W.B.)</li> <li>(ii) Indian Ceramic Socio- ty Annual Exhibition at Kanpur.</li> </ul>	Research activities of the C.G.C.R.I. broadcasted on A.I.R. in February, 1959 and June, 1959.	(i) Newsreel regarding Science & Technology pavilion showing the
	Abuve 600	1	India 1958 Exhibi- tion at New Delhi.	Talk regarding the progress of the In- stitute on June, 58 on A.I.R.	(i) Ministry of I & B Newsreel No. 517 regarding
	About 600	4	Patent Office Exhibition at Calcutta		
	Above 450	m	UNESCO Exhibition		
	Technical enquiries relat- ing to Industrial pro- blems.	Demonstration of factory trials of processes deve- loped	Participation in Exhibitions	Radio Broadcast	Movies .
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<b>\Q</b> :	working at the Institute was released for nation- wide screeing.	(ii) Solving a National Problem screened at Annual General Meet- ing of Indian Ceramic Society.						337		582
S	production of Optical Glass undertaken at the Institute:	(ii) Solving a Na- tional Problem— Optical Glass, pro- duced by CGCRI and screened at In- dia 1958 Exhibition.	ry, Poona	61	1085	14	UTE, LUCKNOW	921	itute, Madras	467
4			iemical Laborato	73	ÌÓ98	00	IG RESEARCH INSTIT	860	HER RESEARCH INST.	475
ε			II-NATIONAL CH	84	1089	16	III-CENTRAL DRU	623	IV-Central Leat	N.A.
1 2				t No. of Research Papers published	2 No. of Technical enquiries attended	3 No. of processes patented .		r Technical Enquiries		I Technical Enquiries

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Practical Demonstrations Conducted	No. of Exhibitions Partici- pated	Symposia held at the In- stitute	Other conferences and con- ventions etc. in which Institute took part		Papers published	Papers communicated for publication	Patents. (a) Accepted .	(b) Filed .		Scientific Papers pub- lished	Bulletins issued	Popular articles published .
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6	:	27		: 1956-57.	wo courses of Studies on 'Corrosion' and 'Bat- teries' are proposed to be started this year.	4	
S	CH INSTITUTE, KARAIKUDI	23	Notes published so far.	were attended so far since	5 T		Symposium on 'Elec- trolytic Cells' (in which 40 papers were read and 37 delegates from diffe- rent parts of the country attended.)
4	ro-Chemical Researc	IO	Non-Technical	Major enquiries	4	:	:
Э	CENTRAL ELECT	5	7	12	:	:	:
	IIA	Papers published .	Non-Technical Notes pub- lished	Technical Enquiries relat- ing to industry attended .	Refresher courses on Elec- troplating persons trained	Persons sponsored by In- dustries to whom training has been imparted	Symposia Organised .
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**APPENDIX XVIII** (Vide para 91) Rules governing Technical Aid rendered by National Laboratories to Industry

1. The national laboratories should not, as a matter of policy undertake routine testing for which facilities exist in the Government Test House and other similar institutions, except when such routine testing forms a part of any surveys or investigations being conducted in the laboratories and for testing in connection with issue of certi-ficates of standardisation. Special tests for which facilities at the existing institutes are not available may be undertaken by the national laboratories provided they do not interfere with the normal work of the laboratories. The certificate for tests will clearly state that it relates only to the sample submitted and examined A schedule of charges will be drawn up by the directors for these tests and submitted to the Executive Council for approval. All fees received under this head are to be credited to the Council funds in full and no portion of these will be available for distribution to the worker or workers concerned.

A remission of 33-1 |3 per cent on testing charges is given to Government Departments and State-owned undertakings and Corporations.

2. For off-hand technical advice to industry, where no investigations need to be undertaken and no written report is necessary no fees would ordinarily be charged. Industry would, however, be required to pay the travelling expenses of the officers concerned.

3. Fees should be charged for technical advice to industry involving minor investigations and submission of written report, the quantum of such fees being determined by the Directors concerned, if necessary, after consulting the Executive Council/DGSIR. In addition to these fees, travelling expenses incurred by officers should be recovered from the industrial organisation concerned.

4. In the case of major problems involving regular investigations, a scheme of research should be drawn up by the Director of the Laboratory concerned in consultation with the Executive Council/ DGSIR and suitable provision made therein for sharing of any royalties

arising out of patents, etc. which may be taken out as a result of these investigations. Any staff appointed under such schemes will be purely temporary and the salary for the same, as well as incidental charges for chemicals, apparatus, gas, water etc. will have to be borne by industry. In all such cases, it would be desirable to draw up a regular statement to avoid misunderstanding of terms at a later stage.

#### APPENDIX XIX

#### (Vide para 92)

## Note regarding the system followed by the Department of Scientific and Industrial Research in the U.K. regarding the recovery of charges for the work undertaken by the Research establishments for industry.

There are four broad categories of work undertaken by D.S.I.R.:-

#### (i) Test work

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Full charge is made of the cost of work to the Department including overheads.

#### (ii) Research work

Full charge is made of the cost of work including the overheads. If the work is recognised from the outset to be of great national interest to other than the people who are asking for it to be done, it may be done co-operatively and the cost may be shared with the Department. This usually arises when the Department is already determined to carry out a piece of research and simultaneously it receives requests for it. The results in this case are the property of the Department.

#### (iii) Answers to Inquiries

No charge is normally made for this work. Where, however, valuable information is given to people especially to consultants, an adequate charge is made.

#### (iv) Sponsored work

This term covers both test work and research work. It covers requests for particular work from outside bodies where the bodies themselves are primarily interested in the work and it is not of value to other people, or they wish the results to be confidential to them. In this case a bigger charge is made. In case in which the results belong to the body that is paying for work, an additional charge would be made which is equal to an additional 50 per cent. over the total cost of the work.

#### APPENDIX XX

### (Vide para 101)

Terms and conditions for giving assistance to Co-operative Research Associations by CSIR the second second

The terms and conditions governing the payments of grants-in-aid by the C.S.I.R. to Co-operative Research Associations formed by Industries are as follows:-

> 1. The Research Association shall be engaged in Scientific activities or scientific and/or industrial research required in the general plan of scientific and industrial development.

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- 2. Representatives of the C S.I.R. shall be nominated on the Governing Body of the Research Association.
- 3. The Research Association shall exercise the utmost economy in its working as also in respect of expenditure from the grants for building and equipment.

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- 4. All expenditure to be met out of the grants shall be sanctioned by the Governing Body of the Research Association or other duly constituted body which ordinarily sanctions such expenditure or by the officers of the Research Association within the limits of specific authority delegated to them.
  - 5. Grants made for a specified purpose shall be utilised for that purpose alone and no re-appropriation of such funds shall be made except with the prior approval of the Council of Scientific and Industrial Research.
  - 6. A copy of the Annual Statement of Accounts of the Research Association duly audited by Chartered Accountants and showing the amounts spent for the purposes for which grants are made, shall be furnished to the Council before 30th April every year.
- 7. Where a grant is made under specific conditions and accepted as such, the Research Association shall strictly observe the conditions; if the Research Association does not comply with the said conditions it shall be liable to refund the grant already received within such

period and in such manner as may be determined by the Council and no other grant shall be made to the said Research Association.

- 8. There shall be no restriction on any citizen in the matter of employment to offices or posts under the Research Association on grounds only of domicile, religion, race, caste or sex.
  - All appointments shall be made by the selection committee which shall be duly constituted under the Rules and Regulations/Bye-laws of the Research Association.
  - 9. The Research Association shall not formulate or amend their Rules and Regulations and Bye-laws without prior consultation with the C.S.I.R.

# APPENDIX XXI

Summary of recommendations conclusions of the Estimates Committee

S. No.	Reference to para No.	Summary of recommendations/conclusions
I	2	3
I _2	14	The Committee are of the view that it would be conducive to the flow of fresh ideas if the con- stitution of the Board of Scientific and Industrial Research provides for the retirement of one-third of the members every year, their places being-filled up by new nominations. In proper cases a re- tiring member or members may also be renomi- nated. The Committee suggest that the new Board may be constituted on the above basis. The Committee suggest that the Research Com- mittees of the CSIR may be made more compact and that they should have sub-Committees com-
		posed of specialists in the particular fields to which the schemes relate, for their proper scrutiny. If necessary, the schemes may subsequently be placed before the main Committee for final app- roval.
3	17	The Committee consider that as in the case of the Board of Scientific and Industrial Research, the infusion of fresh ideas in the delibrations of the Research Committees is essential and this should be secured by constituting the Committees in the same manner as has been suggested in the case of the Board of Scientific and Industrial Research
4	18	The Committee suggest that the annual statement of accounts of the Council together with the Audi Report thereon may be laid before Parliamen regularly from this year onwards.
5	20	The Committee do not share the apprehension the the conversion of the CSIR into a statutory hod

		will introduce an element of rigidity in its working
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which would hamper its activities. On the other hand, such a step would place the organisation on a proper footing and enable it to function with well defined authority. They recommend that the CSIR may be placed on a statutory footing.

6 23 The Committee suggest that the question of merging the Pool Section with the "National Register Unit" and thereby affecting economy in staff may be examined.

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- 24 The Committee recommend that the strength of class IV staff in the CSIR may be reduced by adjustment on the basis of 1 daftri and 1 peon for two sections to begin with.
- 8 24 The Committee are strongly of the view that the general tendency on the part of various Ministries and Departments to engage a large number of Class IV staff especially of an unproductive character should be discouraged and recommend that the total number of Class IV staff for various Sections in a Secretariat organisation should not exceed the limit of one per Section.
  - 25 The Committee recommend that a decision on the question of bringing Publications Directorate, INSDOC, NPL—INSDOC Library and the Information Service under one wing as recommended by Dr. K.S. Krishnan in his report tothe Council may be expedited.
    - 28 The Committee suggest that the powers of the Directors to sanction expenditure on purchase of apparatus and on construction and maintenance works may be reviewed and suitably modified.
  - 29 The Committee suggest that reasons for the wide fluctuations in the percentage of non-technical administrative staff to total sanctioned strength of the various National Laboratories may be analysed in detail and steps taken to reduce this percentage.

12 30 The Committee suggest that the selection of newspapers in which advertisements for recruitment in respect of all-India posts under the CSIR arepublished should be more broad based than at

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		present so that all the areas are adequately served, and if possible every State could be served at least by one of the local papers.
13	32	The Committee would like to see that the new entrants in the National Laboratories looked more for prospects within the Laboratories than out- side.
14	34	The Committee would like to stress that greater efforts should be made to foster a true spirit of research which would secure to the country its proper place in the scientific world within a measurable period of time. The industrial es- tablishments in India, barring a notable few, have not shown the same interest in research as their counterparts in other countries have done. In such circumstances, the need for National Labora- tories to secure to research its proper place and role in national development is ever so much greater. The extent to which they inspire a feel- ing of confidence among the scientific world in providing a proper climate for research is a mea- sure of their utility.
т5	35	The Committee consider that greater attention should be paid to the provision of refresher courses/ specialised courses for the staff of the National Laboratories by industries and educational insti- tutions and that such courses should be held on a regular and systematic basis in order to keep the members of the staff and men from industry abreast of the latest developments and techniques.
IG	36	The Committee recommend that the National Laboratories should have a planned training pro- gramme for their Class IV staff. They also re- commend that the question of reserving a certain percentage of posts in Class III, to be filled up in suitable cases by promotion from Class IV staff when they come up to the requisite standard, should be sympathetically considered.
, <b>1</b> 7	37	The Committee suggest that the question of pro- viding pensionary benefits as an alternate (optional) scheme for contributory provident fund for its employees may be considered by the CSIR.

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18	38	The Committee consider it unfortunate that there has been slow progress of the work of construction of staff quarters for the employees of the National Laboratories, which was entrusted to the C.P.W.D. Now that the CSIR has assumed the responsibility for carrying out the entire work of construction itself, the Committee trust that no efforts would be spared to see that the targets laid down under the housing programme during the second Plan are achieved.
19	38	The Committee suggest that adequate provision for housing facilities for the staff working in the National Laboratories should be included in the Third Plan.
20	38	The Committee suggest that the houses for different categories of staff should not be built in separate blocks or areas, but they should be suitably inter- spersed with common facilities such as dispen- saries, libraries, recreation centres, etc. Such a dovetailing has the added advantage of discourag- ing class consciousness.
21	40	The Committee suggest that the reasons for poor representation of Scheduled Castes and Scheduled Tribes in the various categories of posts under the CSIR may be analysed so that suitable steps can be taken to improve the position without affecting the efficiency adversely.
22	41	The Committee suggest that the reasons for the appreciable fluctuations in administrative ex- penditure and its high rate should be carefully analysed and necessary measures taken to reduce the percentage of expenditure on administration. They also suggest that the feasibility of fixing a suitable maximum limit to this percentage may be examined in consultation with the Ministry of Finance.
23	43	While the Committee note that some donations have been received by the CSIR, they feel that for a big country like ours, the response of the industry has not been encouraging and suggest that suitable steps be taken to promote the idea of the complementary roles of research and in- dustry and the consequential benefits accruing to the latter.

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24	46	The Committee recommend that suitable measures should be taken to avoid shortfalls in expenditure of the CSIR, as compared to the budget estimates.
25	50	The Committee would like to suggest that the CSIR, should endeavour to dispel any misgivings in the minds of the industry in regard to the research programmes of the National Laboratories/Insti- tutes not being related to the needs of the country, and should associate the industry as closely as possible with research projects at all stages and thus create a feeling of belongingness of the Na- tional Laboratories/Institutes in the minds of the industry.
26	51	The Committee recommend that the feasibility of joint planning of programmes by the CSIR, and the Defence Science Organisation may be examined by Government.
¥ 27	52	The Committee cannot overstress the need for closer co-ordination in research work between the National Laboratories and other Research Insti- tutions in the country with a view to avoiding unnecessary duplication and waste of research effort, and they, therefore, recommend that suitable measures should be taken to ensure maxi- mum co-ordination in this direction.
28	53	The Committee suggest that efforts should be made to sponsor more of research centres wherever conditions are favourable for research.
29	54	(a) The Committee suggest that the proposed Reviewing Committee should consist of eminent men from science and industry including one or two outstanding scientists from abroad.
		(b) The Committee also consider that it would be profitable to have the same Reviewing commit- tee or an equally high-powered Committee to scrutinise research programmes formulated for the Third Five Year Plan.
30	56	The Committee consider that interchange of staff between the National Laboratories and the Uni- versities as also between the National Laboratories and allied technical departments of the Govern- ment and Public Undertakings for certain speci- fied periods may be of use from several aspects and,

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		therefore, recommend that the feasibility of th <sup>is</sup> proposal may be examined.
31	57	The Committee consider that it is important that all research workers from Universities or other educational institutions who come to Laboratories should be given a full programme of work and that it should be ensured that they derive full benefit from such association.
32	58	The Committee find that while some Laboratories have been recognised for post-graduate research work by a few Universities, others have been recognised by a large number of Universities. The Committee see no reason why there should be such a diversity in this respect. They consider that the question of recognition of National Laboratories/Institutes by the various Universities for research work needs further attention and suggest that necessary steps may be taken to bring about greater uniformity in the matter as early as possible.
33	58	The Committee consider that the extent and scope of collaboration between the National Labora- tories and the Universities need to be expanded very considerably.
34	60	The Committee suggest that the reasons for the non-utilisation of funds under "Fellowships and Scholarhships" should be investigated without delay and vigorous steps taken to ensure that the funds allotted under this head are utilised in full in future so that a number of scientific and techno- logical workers both within and outside the Labo- ratories are able to take advantage of the scheme.
35	62	The Committee consider that it is desirable to provide for a suitable penalty to be paid by the receipient of the award of a research fellowship who leaves before the expiry of the period of award.
36	65	The Committee consider that it would be worthwhile to examine what have contributed to the short- falls in expenditure from the budgeted amounts on account of pilot plants during the first three years of the Second Plan and eliminate all the

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			reasons responsible therefor since such shor- falls inevitably retard the development and com- mercial exploitation of the processes.
:	37	69	The Committee consider it rather unfortunate that in some cases the results of research should have been hurriedly released to industry for ex- ploitation, for such practice would make en- trepreneurs hesitant in taking up research results for commercial application. The Committee hope that the practice of testing processes on pilot plants before their release and mcking sure that they were acceptable and economical, which had since been adopted, will be strictly adhered to.
	38	70	It is regrettable that adequate attention and care had not been given to the planning and execution of the CSIR's research programmes and schemes prior to the last three years. The Committee recommend that concerted and effective measures should be taken to remove any bottlenecks that may still exist in the way of the commercial ex- ploitation of the processes developed at the Na- tional Laboratories.
	39	71	The Committee would like to observe that if suitable processes have in fact been developed for the production of infanct food or baby food and Vitamin 'C' by the National Laboratories, it is really a matter of concern that licences for their manufacture should have been given to foreign manufacturers. The Committee suggest that the circumstances leading to the issue of licences in these cases should be investigated.
	40	72	The Committee consider it unfortunate that such processes as have been proved on a pilot plant scale to be economically suitable for commercial exploitation should re- main unutilised. They are of the view that the solution to this problem lies in closere collaboration between the National Laboratories and industry which could be secured by asso- ciating the representatives of the industries con- cerned with the research projects and schemes at all stages. The Committee are also of the view that public sector industries should show greater

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		willingness to utilise the processes developed at the National Laboratories and should give a lead to the private industries in this respect.
41	73	The Committee suggest that the strength of the Joint Standing Committee for Scientific Research and Industry should be suitably augmented.
42	74	The Committee regret to note that there has been slow progress and not much of active follow-up action in regard to the recommendations made by the Joint Standing Committee in 1957 relating to the following projects.
		(i) manufacture of sulphur from gypsum and pyrites.
		( <i>ii</i> ) economic utilisation of bones for manufacture of fertilisers.
		( <i>iii</i> ) setting up of a plant for recovery of sodium sulphate from salt bitterns.
		( <i>iv</i> ) manufacture of table salt by open pan and vacuum evaporation by Salt Commissioner, Government of India.
		The Committee consider it to be of vital importance that the recommendations of the Jo int Standing Committee are followed up and implemented within the shortest possible time. They suggest that the progress in respect of the above items may be speeded up. They further suggest that the Joint Standing Committee should periodically review the previous recommendations and ensure that they are expeditiously imple- mented.
43	75	The Committee recommend that immediate steps should be taken to energise the activities of the Small Inventions Development Board.
44	77	The Committee suggest that greater efforts should be made by the Liaison Officers to secure offers from industries for the utilisation of the Council's processes.
45	79	The Committee recommend that the various methods of dissemination of the research results should be made use of adequately in a well planned and co-ordinated manner.

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46	80	The Committee suggest that the reasons for the poor response from industry may be carefully analysed and assessed and positive steps taken to stimulate the interest of industry in the work of the National Laboratories.
47	81	The Committee consider that it would be helpful if each National Laboratory undertakes an analy- sis of all the contacts it has made with industry with a view to ascertaining how contacts are ini- tiated as also the effectiveness or otherwise of the methods of contacts. In the light of such ana- lysis, necessary action may be taken to remove any weaknesses that are noticed in the present system.
48	82	The Committee recommend that a study may be made to evaluate the impact of the publications of the CSIR and the National Laboratories on industry and other interested people. Besides, the CSIR and the National Laboratories should keep in touch with the receipients of their pub- lications and gather their reactions.
49	82	The Committee suggest that the CSIR should bring out publications in English as well as regional languages giving scientific information in non- technical simple language which can be under- stood by a layman.
50	83	The Committee consider it desirable that all the National Laboratories should publish annual reports giving their activities for the year. The reports should be prepared in such a manner as to stimulate enquiries from industry.
51	84	The Committee suggest that the reasons for poor receipts on account of sale of publications in res- pect of the various National Laboratories other than C.G.C.R.I. and I.I.B.E.M. may be carefully investigated and suitable steps taken to step up the income from this source.
52	86	The Committee recommend that urgent steps should be taken to gear up the machinery of the INSDOC so as to ensure quick and efficient service and to fulfil its svowed objectives.
53	87	The Committee would like to observe that the system of allowing visitors to come and see thing

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		for themselves any day as is the case in the Na- tional Physical Laboratory is not satisfactory as it is bound to disturb the work of the staff. The Committee consider that it would be better if the National Laboratories hold 'Open days' for a specified number of days in a year when a very large cross-section of the concerned industry and others interested might be invited to visit the Laboratories and discuss matters with them. If, however, any one wishes to see the Laboratories on other days, he might be permitted to do so by the Director by a previous appointment. Such visits should be so arranged as to avoid any dis- turbance to research work carried on in the Laboratory.	
54	88	The Committee suggest that the reasons for the lack of response from the Community Develop- ment Organisation in the matter of deputing some of their officers to the National Labora- tories/Institutes to receive training under refresher courses may be investigated and remedial measures taken.	
55	89	The Committee recommend that prompt and vigo- rous steps should be taken to augment the Exten- sion Service of the CFTRI so as to ensure that the benefits of research reach the common man.	

- 56 90 The Committee recommend that suitable measures should be taken to attract persons for taking up work in the Extension Service of the Central Leather Research Institute.
- 57 93 The Committee recommend that the system obtaining in the U.K. regarding the recovery of charges for work done by the Research establishments of the Department of Scientific and Industrial Research for industry may be adopted by the National Laboratories of the CSIR with such minor modifications as are considered absolutely necessary.
- 58 95 The Committee recommend that concerted and determined efforts should be made by the Council and its National Laboratories to increase the receipts for the work undertaken by the National

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		Laboratories on behalf of industry and Govern- ment Departments. The Committee trust that if the present system of charging fees by the National Laboratories is modified on the lines of the system obtaining in the U.K., it would help in augmenting the income accruing to the Na- tional Laboratories from this source.
59	96	The Committee consider that the question of intro- duction of research cells in the industries is of vital importance and should be vigorously pursued. The industries may be given suitable inducements, if necessary, for introducing re- search cells in their respective industries.
60	98	The Committee are of the view that there is a need for greater efforts being made than at present

to bring home to industry the importance of industrial research for its own advancement no less than that of the country.
 61 99 The Committee consider that studies of the research and development resources and requirements of the particular sectors of the industry are desirable and should be initiated. In this conception the variable and should be initiated or the sector.

desirable and should be initiated. In this connection, the desirability of appointing a professional group of social scientists at the headquarters of the CSIR to undertake a continuous study of (a) service of research institutions to the industry (b) the needs of industry in terms of research and development, and other cognate matters may be considered.

62 IO2 The Committee are of the opinion that there is considerable scope in India to make industries interested in forming industrial research associations. They, therefore, recommend that active steps should be taken to encourage the formation of Co-operative Research Associations for Foundry, Cement, Mica, Electronics, Small machinery manufacture, footwear and automobile industries.

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# APPENDIX XXII

Analysis of recommendations contained in the Report.

I. CLASSIFICATION OF RECOMMENDATIONS

A. Recommendations for improving organisation and working:

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**11.** ANALYSIS OF THE MORE IMPORTANT RECOMMENDATIONS DIRECTED TOWARDS ECONOMY (INCLUDING THOSE FOR INCREASING THE INCOME)

Serial No.	No. as per summary of re- commen- dation	Particulars
I	2	3
I	6	Merger of Pool Section with National Register Unit.
2	7	For reduction in the strength of Class IV staff in the C.S.I.R.
3	8	For reduction in the strength of Class IV staff in a secretariat organisation.
4	9	For bringing under one wing Publications Direc- torate, INSDOC, NPL-INSDOC Library and the Information Service.

I	2	3
5	11	For reduction in percentage of non-technical ad- ministrative staff to total sanctioned strength of the National Laboratories.
6	22	For reduction in the percentage of expenditure on administration.
7	51	Steps to be taken to step up income on account of sale of publications.
8	57	Regarding recovery of charges for work done by the National Laboratories.
9	58	To increase receipts for work done by the Council and its National Laboratories.

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