E.C. No. 511

ESTIMATES COMMITTEE (1967-68)

NINETEENTH REPORT

(FOURTH LOK SABHA)

MINISTRY OF EDUCATION

Action taken by Government on the recommendations contained in the Hundred and Third Report of the Estimates Committee (Third Lok Sabha) on the Ministry of Education—C.S.I.R.—National Physical Laboratory, New Delhi.

LOK SABHA SECRETARIAT
NEW DELHI
February, 1968/*Magha*, 1889 (*Saka*)
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Nineteenth Report of Estimates Committee (Fourth Lok Sabha) on action taken by Government on the recommendations contained in the 103rd Report of the Estimates Committee (Third Lok Sabha)on the Ministry of Education - C.S.I.R. - National Physical Laboratory, New Delhi.

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Title Page, last line, for 'Price 55 paise' read 'Price Re.1.00'.

Page 2, last line, for 'recommended' read 'recommend'.

Page 14, line 2, for 'handling' read 'handing'.

Page 33, line 6 from bottom, for 'tht NPL' read 'the NPL'.

Page 41, line 14 from bottom, for 'on' read 'or'.

Page 65, line 3, for 'taken' read 'take'.

Page 65, line 3, delete 'date'.

CONTENTS

3010 (aii) LS—1.

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(1967-68)

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(1967-68)

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INTRODUCTION

I, the Chairman of the Estimates Committee, having been authorised by the Committee, present this Nineteenth Report of the Estimates Committee on the action taken by Government on the recommendations contained in the Hundred and Third Report of the Estimates Committee (Third Lok Sabha) on the Ministry of Education—C.S.I.R.—National Physical Laboratory, New Delhi.

2. The Hundred and Third Report of the Estimates Committee was presented to the Lok Sabha on the 22nd April, 1966. Government furnished their replies indicating the action taken on the recommendations contained in the Report on the 22nd February, 1967. Further information in respect of 10 recommendations called for from Government was received on the 7th, 19th, 24th October and 7th November, 1967. Replies were considered by the Study Group 'F' of the Estimates Committee on the 28th November, 1967.

3. The Report has been divided into the following three chapters:

I. Report.

II. Recommendations that have been accepted by Government.

III. Recommendations which the Committee do not desire to pursue in view of the Government's reply.

The Report was considered and adopted by the Committee on 1st February 1968.

4. An analysis of the action taken by Government on the recommendations contained in the Hundred and Third Report of the Estimates Committee (Third Lok Sabha) is given in Appendix III. It would be observed therefrom that out of 61 recommendations made in the Report, 49 recommendations, *i.e.*, 80·3 per cent. have been accepted by Government and the Committee do not desire to pursue 12 recommendations, *i.e.*, 19·7 per cent. in view of the Government's reply.

P. VENKATASUBBAIAH,
Chairman,
Estimates Committee.

NEW DELHI-1;
February 12, 1968.
Magha 23, 1889 (*Saka*)

CHAPTER I

REPORT

The Estimates Committee are glad to observe that the recommendations contained in their Hundred and Third Report (Third Lok Sabha) on the Ministry of Education—C.S.I.R.—National Physical Laboratory, New Delhi have been generally accepted by Government.

CHAPTER II

RECOMMENDATIONS THAT HAVE BEEN ACCEPTED BY THE GOVERNMENT

Recommendation (Serial No. 2 Para. 13)

(i) *The Committee regret to note that India has no central body to coordinate, promote or plan her research and its utilisation, with the result that the research potential has not been exploited fully to achieve the major national goals of the country during the first three Five Year Plans. The absence of such a central body has resulted in diffusion of energy and resources as also in duplication and has adversely affected the optimum utilisation of funds made available for scientific research and effective coordination between different agencies.*

The Committee note that a Study Group for Scientific Research has at last been constituted in the Planning Commission towards the middle of 1965. The Committee consider that as the resources for research in India are extremely limited and the expenditure on research as percentage of national income is as low as 0·32 compared to other advanced countries (USSR—3.00; USA—2.9; UK—2.7) there is need for carefully husbanding the resources. They would like the Study Group to ensure that research allocations in the Fourth Plan are spread out keeping in view the relative importance of research so as to render maximum assistance in the developmental plans of the country.

(ii) *The Committee suggest that the Study Group should also lay down guide lines for collection of basic data regarding research being undertaken by different agencies in Government and private sector so as to have reliable overall information to decide the strategy of research in the interest of planned development of the country. The Committee suggest that the Study Group should carefully assess from time to time the progress made in tackling research problems particularly those which are of strategic importance to the development of the country and take suitable measures to make up deficiency or intensify research, as required.*

Now that the Study Group has been constituted, the Committee recommended that it should immediately apply itself to the major

task of planning of research so that it is in tune and on par with planning in other sectors of national development in the country.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been brought to the notice of the Planning Commission.

[*CSIR U. O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 3 Para 20)

(i) *The Committee note that the recommendations regarding the working and reorganisation of the National Physical Laboratory made by Prof. Blackett in 1963 were generally agreed to by the Scientific Sub-Committee of the Executive Council of the National Physical Laboratory and the Executive Council itself in 1963. In fact these recommendations were also generally endorsed by the Third Reviewing Committee of the C.S.I.R. The Committee note the lack of sense of urgency shown by the authorities in examining the Blackett Report which remained under consideration of the Executive Council and its Sub-committee for two years. The Committee consider that the authorities concerned should have taken firm and expeditious decision on the Blackett Report. The Committee regret to note that even before these recommendations were implemented and given a fair trial, the whole matter was reopened soon after the appointment of the preceding Director of the National Physical Laboratory. The result has been that the major recommendations regarding the reorganisation of the divisions and the setting up of commercial units were reversed and the 'status quo ante' more or less restored. It is surprising that the Executive Council which had earlier accepted the recommendation of Prof. Blackett to reorganise the National Physical Laboratory, later reversed its own decisions on the note of the Director without giving a fair trial to the new set up. The Committee consider that the existence of a large number of divisions in the Laboratory tends to create compartmentalisation and comes in the way of coordinated efforts as has been admitted by the Director General of Scientific and Industrial Research also.*

(ii) *The Committee consider that the work in the Laboratory should be organised increasingly according to projects and that Divisions and Sections should be reduced to the minimum. They have no doubt that the work of the existing 22 divisions would be critically and carefully reviewed with a view to effect coordination and economy.*

(iii) *As regards the setting up of the Advanced Centres of Study, the Committee are generally in agreement with the views expressed*

by the Third Reviewing Committee that the right place for setting up centres of Advanced Studies is in the Universities and not as part of Council of Scientific and Industrial Research establishments; the Committee would, however, stress the need for closer coordination between the C.S.I.R. and the Universities so that the use of specialised equipment available in C.S.I.R. laboratories is not denied to Universities for carrying out advanced research in the subjects concerned.

REPLY OF THE GOVERNMENT

Parts (i) and (ii) of the recommendation have been answered while replying to recommendations at Serial Nos. 4, 8 and 51 in Appendix XII of 103rd Report of the Estimates Committee on N.P.L.

As regards (iii), closer collaboration exists between the N.P.L. and the Universities by means of N.P.L. scientists giving lectures in University Departments in their fields of specialisation, Guest scientists from Universities being invited to work in the N.P.L. and by being allowed the use of specialised equipment available at the National Physical Laboratory.

The attention of the other Laboratories/Institutes has also since been invited to these recommendations of the Estimates Committee for compliance.

[*CSIR U.O. No. 2/4/66-PU, dated 22nd February, 1967*]

Recommendation (Serial No. 4, Para 21)

The Committee consider that classification of research should be more detailed than that which has at present been adopted in the National Laboratories. They, therefore, suggest that the feasibility of adopting detailed classification for the research and development work conducted in the various laboratories of CSIR may be examined, which was agreed to by the Director General, Scientific and Industrial Research during evidence.

REPLY OF THE GOVERNMENT

The research programmes in the National Laboratories/Institutes are being oriented on project basis to the extent possible and also classified in terms of their relationship to defence, import substitution, export promotion, food and agriculture, industrial technology and basic research in accordance with a recent directive of the Governing Body of the CSIR.

[*CSIR U. O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 5, Para 22)

The Committee are in agreement with the views expressed by the Zuckerman Committee (U.K.) that pure basic research should be carried out in a university rather than in a research laboratory. The Committee regret to observe that in spite of the recommendations made by the Third Reviewing Committee and the opinion expressed by Prof. Blackett, no conscious effort appears to have been made by the National Physical Laboratory to shed its pure basic research work. The Committee realise the difficulties of stopping altogether the basic research done in the National Physical Laboratory as it has grown there over a number of years for "historical reasons". The Committee however recommend that determined efforts should be made by the Council of Scientific and Industrial Research and the National Physical Laboratory to reduce the quantum of basic research to the minimum necessary for supporting the applied research. In this connection it would be useful if detailed information is kept about the proportion of the basic and applied research work done in the National Physical Laboratory so that a watch could be kept on the progress made in this regard from year to year. The Committee would also like Government to ensure that simultaneous efforts are made in right earnest to promote and strengthen basic research in Universities in appropriate measure.

REPLY OF THE GOVERNMENT

The recommendation of the Committee has been brought to the notice of the University Grants Commission and the Ministry of Education. The Universtiy Grants Commission have since stated:

> "that subject to limitation of funds placed at its disposal, the U. G. C. has taken steps to support and assist basic research in science subjects in the Universities.
>
> The Commission is of the view that applied research cannot be completely isolated from basic research and while agreeing generally with the recommendations of the Estimates Committee regarding the N. P. L., the U. G. C. would emphasise that greater collaboration between the National Laboratories and the Universities would be desirable for achieving the objectives of basic and applied research."

The collaboration existing between the Universities and the N. P. L. has been mentioned in reply to recommendation at Serial No. 3 in Appendix XII of the Report.

The Director, National Physical Laboratory, New Delhi has intimated that out of the 88 approved projects for the year 1966-67, only 18 may be classified as of basic nature. Even these with the passage of time would have an important influence on applied physics.

[*CSIR U. O. No. 2/4/66-PU dated 22nd February, 1967*]

COMMENTS OF THE COMMITTEE

The Committee trust that detailed information about Basic and Applied Research done in the N. P. L. would be given in the Annual Report of N. P. L.

Recommendation (Serial No. 7, Para 24)

The Committee appreciate that selection of projects is a difficult task—first of all it is necessary to locate the areas in which research is needed and may yield good results, and secondly to determine how many of these could be fruitfully undertaken at a given time with the resources of a laboratory. It is also essential to ensure that there will be full and effective co-ordination and no unnecessary duplication of research work, and that research planned in a laboratory is not already being done at other laboratories or institutions without proper consultation and coordination. The task is even more complicated for the National Physical Laboratory where for historical reasons, the headings of the projects are given 'from text books like Solid State Physics Projects' as admitted by Director General, Scientific & Industrial Research during evidence—a practice which the Committee feel should have been abandoned long ago. The Committee recommend that National Physical Laboratory should evolve an effective machinery for locating the needs of industry and user departments within the scope of its objectives and select projects which will yield quick returns. The Committee further suggest that the principles enunciated by the Zuckerman Committee (U.K.) for selecting projects for applied research which provide valuable guidelines in this regard, should be considered for adoption by the national laboratories in the country.

REPLY OF THE GOVERNMENT

To locate the needs of industry and user departments, the N.P.L. would be organising periodical 'Get Togethers' between industry and the laboratory.

The recommendations of the Zuckerman Committee (U.K.) for selecting projects for applied research have been circulated to the National Laboratories/Institutes/Research Associations for guidance.

[*CSIR U.O. No. 2/4/66-PU, dated 22nd February, 1967*]

Recommendation (Serial No. 8, Para 29)

The Committee regret to note that in spite of the clear directive of the Executive Council of the National Physical Laboratory in April, 1964 for recasting of the project report for 1964-65, National Physical Laboratory has not been able to carry out the directive till date. Even the project report for 1965-66 has not been prepared in accordance with the suggestions of the Executive Council and the decisions taken at the 14th Directors' Conference. On the other hand the Committee note that at Central Electronics Engineering Research Institute, a sister laboratory, a project proforma is drawn up which more or less conforms to the suggestion of the Executive Council, and which inter alia gives a survey of the potential users, the technical approach to be followed, the main requirements, the major steps and the estimated time for completion of each of the major steps as well as the entire project. The Committee cannot help observing that there appears to be persistent resistance at the National Physical Laboratory to adopt new ideas and progressive procedures in such matters.

It is really surprising that neither the CSIR nor the Executive Council of the National Physical Laboratory could so far ensure that the National Physical Laboratory formulates its programme of research and other project report in accordance with the procedures laid down by them. The Committee suggest that the CSIR should lay down standard proformas for the preparation of project reports by the national laboratory and ensure their implementation in actual practice.

REPLY OF THE GOVERNMENT

The research work of the National Physical Laboratory for 1966-67 has been prepared project-wise on the prescribed proforma, a copy of which is enclosed.*

[*CSIR U.O. No. 2/4/66-PU, dated 22nd February, 1967*]

Recommendation (Serial No. 9, Para 32)

The Committee are in agreement with the decision of the Executive Council of the National Physical Laboratory that no scientist should be associated with more than three or four projects as otherwise the senior scientists tend to associate themselves with all projects of their division irrespective of the fact whether they could devote their time effectively to those projects and whether they have the technical aptitude for all the projects. Further the association

*Not Printed.

of one scientist with many projects, apart from causing delays in the progress of projects, does not allow the junior scientist to share the pride of participation in the project which is necessary to enthuse him.

The Committee regret to note that action to implement the above decision of the Executive Council of October, 1964 is being taken only now. They hope that at least now this decision will be implemented in right earnest. The Committee further suggest that the Council of Scientific and Industrial Research should ensure that this principle is observed in other laboratories also.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been noted by the National Physical Laboratory. It has also been brought to the attention of all the National Laboratories/Institutes of the C.S.I.R. for implementation.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 10, Para 33)

The Committee are surprised that even though the need of costing of research projects was felt by the Council of Scientific and Industrial Research, the same has not been implemented in the National Physical Laboratory. The Committee would like to draw attention to the recommendation made in this connection by the Zuckerman Committee (U.K.) that "in the control of applied research or development, an assessment of results achieved and of likely future progress should always be carried out concurrently with a view of expenditure to date and estimated future costs. Such dual assessments should be undertaken at intervals of not more than three to six months, and the results should be made available not only to higher management but also as a way of encouraging cost consciousness, to those who are directly responsible for individual projects i.e. down to Principal Scientific Officer level, or possibly lower."

The Committee strongly urge that methods of accounting in the national laboratories should be reoriented in such a way as to ensure that estimated and actual costs of individual research projects are available. They would also emphasise that the progress made in each research project should be reviewed by the Director of the Laboratory with the Project Leader once a quarter with specific reference to the actual and anticipated expenditure so as to achieve maximum economy consistent with results.

REPLY OF THE GOVERNMENT

Kind attention of the Estimates Committee is invited in this connection to the reply of the Government to Para 15 (S. No. 4) of their 104th Report relating to the Central Electronics Engineering Research Institute, Pilani.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 11, Para 35)

The Committee note with concern that the Fourth Plan proposals of the National Physical Laboratory indicate only the broad financial outlay and do not specify the projects in accordance with their relative significance from the point of view of defence, import substitution, promotion of indigenous know-how etc., for which the financial outlays are earmarked. The Committee feel that the Study Group of the Planning Commission should be provided with such vital statistics as number of projects under various Divisions and their significance in national economy, the progress made in respect of each of the projects, the probable date of completion and approximate expenditure etc. These statistics are important even for the National Physical Laboratory itself to achieve physical targets in respect of its various schemes. The Committee are afraid that the procedure followed by other laboratories of C.S.I.R. for preparation of Plan proposals is also the same as followed by National Physical Laboratory and strongly recommend for its revision so as to incorporate all the necessary data required to enable the planners to examine the programme of each laboratory in the context of national economy.

The Committee would therefore strongly urge that the National Physical Laboratory should take immediate steps to reorient its research programme in the context of defence requirements, import substitution and building up of indigenous know-how.

The Committee are distressed to note that neither the Planning Commission, nor the Ministry of Industry/Directorate General, Technical Development nor any other user departments have indicated specific areas where the potentialities of the National Physical Laboratory could be fruitfully exploited during the Fourth Plan. The Committee deplore this lack of contact between the National Physical Laboratory and the potential users even among the Government departments. They, however, hope that various Technical Committees set up as a result of the recommendations of the Conference of Research and Industry held in December, 1965 would be able to indicate specific problems to National Physical Laboratory for solution during the Fourth Plan period.

REPLY OF THE GOVERNMENT

The recommendation at first para has already been brought to the attention of the National Laboratories/Institutes, including the N.P.L., while answering recommendation at S. No. 5 in Appendix V, contained in para 21 of the 104th Report of the Estimates Committee on CEERI, Pilani.

The research projects in the National Laboratories/Institutes including N.P.L., have been reoriented on project basis to the extent possible in terms of their relationship to defence, import substitution, export promotion, food and agriculture, industrial technology and basic research in accordance with a recent decision of the Governing Body of the CSIR.

[*CSIR U.O. No. 2/4/66-PU, dated 22nd February, 1967*]

Recommendation (Serial No. 12, Para 36)

The Committee are glad to note that the National Physical Laboratory has prepared a perspective plan for the next 10-15 years. The Committee recommend that the perspective plan of the National Physical Laboratory should be fitted into the national plan for the development of research within the country and should be based on the perspective plan of industrial and scientific development of the country for the next three Plan periods. They further suggest that this should be widely circulated amongst the industry, user departments, research institutions and scientists for inviting their suggestions so that the plan could be improved upon and duplication of research efforts among institutions could be avoided.

REPLY OF THE GOVERNMENT

For the industrial and scientific development of the country the need for materials which go into the manufacture has been very greatly felt in the past. The National Physical Laboratory has created a Materials Division in 1966-67. It is expected that this Division will do considerable amount of work in fields which fall within the purview of the NPL, such as the production of high purity metals and semi-conductors required for the manufacture of transistors, solid state devices and reference standard materials etc. The Laboratory has also on its programme development of other materials such as phosphor; and luminiscent materials for the optical and electronic industries. The Laboratory had already worked on the production of components for the electronic industry as well as for the carbon industry.

The projects taken in hand, keeping the above objective in view, have been brought out in the NPL Technical Bulletin Vol. 1 No. 4 October, 1966 issue. The bulletin is very widely circulated amongst the industries, research institutions, universities and Government Departments and other organisations. As a result of this NPL have begun getting enquiries about the projects. In addition to this the projects of the laboratory were circulated among the various sister laboratories and research institutions and in exchange their projects were also obtained to avoid duplication of work. Since this year, the laboratory has formed a Panel of Consultants to advise the Director on various projects undertaken in the laboratory. The members of these panels are experts in their particular lines and this ensures that there is no duplication of work. Similarly some members of the staff act as consultants to other institutions which also fulfils the same purpose.

The other recommendation of the committee *viz.* that the perspective plan of the NPL should be based on the perspective plan of Industrial & Scientific development of the country for the next three plan periods has been noted.

[CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967]

COMMENTS OF THE COMMITTEE

The Committee hope that the perspective Plan of N.P.L. would be circulated among the industry, user departments, research institutions and Scientists etc. for inviting their suggestions.

Recommendation (Serial No. 13, Para 38)

While the Committee note that the N.P.L. has been solving research problems referred to it by the Industry and user departments, they consider that the number of such problems—54 in four years—has been very small in the past, considering the facilities available at the NPL and the number of problems requiring solution. The Committee are aware that in India both public and private industries are less research minded than those in the advanced countries and do not have proper machinery for formulating their requirements for research to be undertaken at the laboratories. The Committee consider that National Physical Laboratory should try to create an atmosphere whereby industry is encouraged to approach it with its technological problems. The Committee have no doubt that NPL can gain the confidence of the industry if successful solutions of their problems are found expeditiously and communicated to them urgently.

The Committee are sure that National Physical Laboratory can be of great help to small scale industries which have largely to depend upon indigenous know-how for their future development. The Central Small Industries Organisation can do a great deal in formulating the requirements of the small scale industries which require research to be carried out at the National Physical Laboratory.

REPLY OF THE GOVERNMENT

With a view to maintaining proper liaison with the industry, knowing their problems and also making them aware of the facilities available in the Laboratory as regards testing, calibration, standardisation etc., a Division of Planning and Liaison has since been created at the N.P.L. The publication of the "NPL Technical Bulletin" also ensuring liaison with the industry. The bulletin highlights the main achievements of the laboratory. This would enable the industrialists to know the processes developed in the laboratory and the facilities available to standardise their production.

It is also proposed to maintain liaison with the industry by taking part in exhibitions, Get-together, arranging Open-Days at NPL and by giving lectures on selected topics. For instance, one of the officers of the laboratory contacted the Director of Industries, Delhi and also gave two lectures in this connection before the industrialists. The efforts so far put in has resulted in encouraging response. The NPL has brought to the notice of the small scale industries institutions, the work carried out in the Laboratory with the request that this may be brought to the notice of the units working under their control. In addition, whenever samples are received for testing from small scale industries, help is given by way of advice.

The recommendation of the Estimates Committee for formulating the requirements of the small scale industries which require research to be carired out at the NPL has been communicated to the Development Commissioner, Small Scale Industries, New Delhi for necessary action.

[*CSIR No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 14, Para 39)

The Committee welcome the steps, though belated, taken by C.S.I.R. for organising the Conference of representatives of research and industry to build a bridge which may eventually open a new era of industrialisation in the country. The Committee recommend that such Conference should be held periodically so that there ir

utmost co-ordination between research and industry and research can render the expected help to industry.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been noted. The question as to how the CSIR could participate more effectively in industrial development also came up for discussion at the 52nd meeting of the Governing Body of the CSIR held on 19th November, 1966. The Governing Body was also of the view that "The method adopted in the 'Research & Industry Get-Together' should be followed up and there should be more frequent meetings between research and industry at the level of individual industries. It was decided that the Working Groups formed at the last 'Get Together' of Research & Industry should be reconstituted so as to limit the membership only to those who are likely to make significant contribution and also to ensure adequate representation from industry." Further action is being taken in the light of the Governing Body's decision.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 15, Para 40)

The Committee regret the slow progress made by the N.P.L. on the two PL-480 research schemes. The Committee would urge that once such schemes have been undertaken in co-operation with foreign institutes, they should be completed expeditiously within the stipulated time schedules. The Committee further suggest that while selecting projects under foreign assistance in future, the Laboratory should always bear in mind that the selected projects fit in with the objectives of the laboratories, so that the energies of the scientists are not dissipated on projects of extraneous nature.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been noted.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 16, Para 44)

The Committee note that only 22 processes have been successfully evolved so far by the N. P. L. for commercial exploitation. Out of these about half a dozen only are being produced on a commercial scale. In many cases the annual value of production is not very large. Considering the heavy expenditure that has been incurred on the working of the NPL during the last 15 years, the Committee cannot help feeling that its performance in the field of industrial research during this period has been rather disappointing. It would appear that in the past, due care was not given to the selection of research programmes which should have been oriented towards industry and capable of yielding quick results.

It is regrettable that in three cases, there has been a delay ranging from 7 to 9 years in handling over the processes to the National Research Development Corporation after their successful completion by the NPL. Thereafter there have been further delays ranging from 1 to 3 years in giving the processes for commercial exploitation by the N. R. D. C. The result has been that in some cases it has taken 10 years to exploit a process for commercial production after it is stated to have been completed successfully by the N.P.L.

The Committee note with regret that six out of seven processes developed by the National Physical Laboratory and intended to be given free to industry remain yet to be commercially exploited and that a few of the processes such as Carbon Slabs, Ceramic Capacitors, etc. though established as long back as 1959-60 have not been fully exploited to meet the requirements of the country thus necessitating imports of the commodities. The Committee are also not happy that as many as eight processes should still be exploited by departmental production. The Committee feel that the responsibility for ensuring expeditious commercial exploitation of the processes, as soon as they are successfully developed at the Laboratory, devolves both on the Laboratory itself and the National Research Development Corporation whose main aim is to develop and exploit in the public interest for profit or otherwise, inventions, whether patentable or otherwise including technical and engineering 'know-how' of processes developed by the CSIR laboratories." Research and development are continuous processes; and therefore the Laboratory should not remain in seclusion after successful completion of processes but should also maintain closest links with National Research Development Corporation and the Director General Technical Development to see that successful processes are being fully exploited for the benefit of the country. The Committee suggest that the successful processes should be widely published to stimulate interest of industrialists and users.

The Committee also note that recently the CSIR has sanctioned an Industrial Engineering Section for the National Physical Laboratory. The Comittee hope that this Section will render necessary assistance resolving technical problems faced in translating the processes developed in the Laboratory to large scale manufacture.

Reply of the Government

The recommendations of the Estimates Committee have been noted. The N. P. L. has taken suitable steps to stimulate interest in industrialists to utilise the processes developed at the Laboratory

and also to reduce the time lag in their exploitation. These have been detailed while replying to recommendation at Serial No. 13 in Appendix XII contained in para 38 of the 103rd Report of the Estimates Committee on N.P.L.

[*CSIR U. O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 17, Para 50)

The Committee note with regret that though two firms were licensed in August, 1963 and July, 1964 to manufacture soft ferrites with the process developed by National Physical Laboratory, they have yet to go into full production, thus necessitating import of soft ferrites in addition to their production departmentally by the National Physical Laboratory. The Committee recommend that National Research Development Corporation should ensure that the parties, who are granted licences for commercial exploitation of the C.S.I.R. processes, actually adhere to the stipulated schedules for commercial production and that the production targets are adhered to by them in actual practice.

The Committee should think that since soft ferrites can be manufactured with the know-how developed by National Physical Laboratory there should be no occasion for allowing foreign collaboration for manufacture of this variety of soft ferrites. Effective measures should also be taken to ensure that production of soft ferrites is commenced immediately by the firms concerned, with the National Physical Laboratory process, in order to meet all internal requirements so that the import of soft ferrites and departmental production by National Physical Laboratory could be stopped, as early as possible.

REPLY OF THE GOVERNMENT

The licences issued to two firms M/s. Morris Electronics Private Ltd., Poona and M/s. Semi-Conductors Pvt. Ltd., Poona became effective from 1/4/64 and not in August, 1963 and July, 1964 as mentioned in the recommendation. The period by which the licensee firms are required to go into production is stipulated in the agreement. In the present case the agreement *inter-alia* provided "if the Grantee fails to start manufacture according to said invention within a period of 12 months from the date of licence *viz.*, 1st April, 1964; in the event the Grantee being unable to set up production within stipulated period *viz.*, 31st March, 1965 due to unavoidable circumstances and causes beyond the control of the Grantee, the Grantee will make a request in writing for extension of the time limit before the expiry of the date giving detailed reasons." In terms of this clause, the

NRDC extended the date of going into production till 30-9-1965 for Mrs. Morris Electronics and till 1-4-1966 for M/s. Semi-Conductors.

Both the firms M/s. Morris Electronics and Semi Conductors have gone into production from 1-10-65 and 15-9-65 respectively. The Directorate General of Technical Development have intimated that M/s. Morris Electronics have asked for expansion of their Unit which has been supported by DGTD and a letter of provisional approval issued.

In addition to the above two firms licences to the following three firms have also since been issued:

Name of the Party	Effective date of licence.	Date by which required to establish production
1. Singhson Radio Co. Pvt. Ltd., New Delhi	1-10-1965	30-9-1966
2. Molecular Electronics Pvt. Ltd., Calcutta	1-10-1965	30-9-1966
3. UMS. Radio factory, Coimbatore . .	1-4-1966	31-3-1967

These firms have not so far gone into production.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 18, Para 51)

I. The Committee deprecate the tendency to give such a large number of licences to a firm with foreign collaboration. They also feel unhappy at the repeated extensions given to the firm to establish manufacture of these items.

II. The Committee note that the delay in the manufacture of the electronic components was mainly due to the non-availability of foreign exchange. They feel that in cases where foreign collaborations are agreed to, the provision of foreign exchange requirements for the unit should be generally made the responsibility of the foreign collaborators.

III. The Committee would like to point out that granting of such blanket licence for the manufacture of large number of items is apt

to dampen the research effort within the country and act as a disincentive to the manufacture of products with indigenous know-how. The Committee recommend that before negotiations for foreign collaboration are started or the capacity of the existing licences is increased, the concerned Ministries/Directorate General, Technical Development should contact the national laboratories and other research units to find out whether and when they can establish the necessary know-how.

REPLY OF THE GOVERNMENT

The Ministry of Industrial Development and Company Affairs who is concerned with the recommendation of the Committee has furnished the following reply:—

I. *Reply to Para I of the recommendation:*

Philips had applied for taking up manufacture of a number of components, mainly for radio receiver industry in July, 1960, when most of the components such as polyester capacitors, electrolytic capacitor, potentiometers, loudspeakers, ceramic capacitors (tubular type), variable condensers, trimmers, were not being made in the country and the radio assembly was dependent almost entirely on their imports.

It may also be mentioned that level of production of radio receivers at that time and the target for radio receivers for Second Plan were so low that not many entrepreneurs were coming forward for setting up independent units for manufacture of components. It was in this background that Philips and other radio manufacturers, such as Mulchandani, Murphy, came forward to take up production of radio components with a view to meeting their own requirements and also for supplying to other radio manufacturers. M/s. Philips India Ltd. are collaborating with M/s. Philips of Holland and the latter produces almost the entire range of electronic components required for the Radio Industry. It is on this account that Philips asked for an industrial licence for taking up manufacture of a large variety of components. It may be mentioned that Philips had at one stage indicated their interest for taking up manufacture of transistors, but they were discouraged from doing so, as they had offered technical collaboration to Messrs BEL for manufacture of transistors.

As regards the capacities licensed to Philips in respect of various components, it may be mentioned that besides Philips, industrial

licences have been given to a large number of parties for manufacture of similar components. Some specific examples are given below:—

Component	Capacity licensed to Philips	Total Capacity licensed to others
Carbon Film resistors	13·2 Mill Nos.	55·68 Mill Nos.
Loudspeakers	7·4 Lakhs „	1·92 Mill Do.
Band Change Switches	5·4 Lakhs „	1·6 Mill Do.
Gang condensors	6·36 „ „	1·138 Do.
Potentiometers	1·7 Mill „	5·438 Do.
Electrolytic capacitors	1·92 „ „	20·42 Do.
Ceramic Capacitor	9·6 „ „	27·18 Do.
Polyester/styroflex capacitors	3·84 „ „	16·20 Do.

It may be mentioned in this connection that capacities licensed for manufacture of electronic components are very much on the low side compared to the production capacities of units in foreign countries with the result that cost of production of components in India is considerably higher. One of the recommendations of the Bhabha Committee on the Components Industry is that in future there should be fewer units with the larger capacities in order to achieve economies of scale.

II. *Reply to Para II of the recommendation*:

It will not be practicable to secure this in all cases, particularly so in the case of import or export oriented industries. In cases where it is our policy to allow foreign investment, foreign exchange requirements for import of capital goods are normally allowed upto 49% of the equity; however, if the capital goods requirements exceed 49%, equity participation in excess of this is not allowed and other alternatives are considered. Wherever practicable, in respect of recurring import of raw materials or components it is stipulated that the party should meet this by export earnings.

III. *Reply to Para III of the recommendation*:

In so far as electronic component industry is concerned, the D.G.T.D. have not supported foreign technical collaboration in respect of items of components for which know-how has been developed

by the National Laboratories etc. Keeping this in view, although Messrs Philips have been permitted to manufacture ceramic capacitors, this item has been excluded for payment of technical know-how etc, from the overall technical agreement of Philips. Similarly, no foreign technical collaboration has been permitted for manufacture of mica capacitors as know-how for the same has been developed by N.P.L. Another item in respect of which DGTD do not support foreign know-how collaboration is Ferrites.

In order to promote the utilisation of indigenous know-how and processes in the industrial units set up in the country, every proposal for the import of technical know-how is carefully considered whether the technology involved is not indigenously available and whether collaboration is necessary for the proper development of a particular industry. With this object in view the comments of the CSIR are invited in respect of all foreign technical collaboration proposals and a representative of the CSIR is associated as a member of the Inter-Ministerial Committees which consider (1) applications for the issue of industrial licences and (2) applications for approval of the terms of foreign collaboration. A Joint Committee of the CSIR and the D. G. T. D. has been formed for close and continuous liaison betwen these two bodies.

The Committee set up by the Government under the Chairmanship of Dr. A. Ramaswami Mudaliar to examine the question of utilisation of indigenous technical know-how *vis-a-vis* the need for foreign collaboration is also examining this aspect. The Report of the Committee is likely to be available shortly.

[*CSIR U. O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 19, Para 56)

The Committee cannot resist the conclusion that there has not been close co-operation between the National Physical Laboratory and the Indian Telephone Industries in the matter of developing professional ferrites. The Committee consider that both the organisations should have shown greater sense of urgency in developing suitable professional ferrites with indigenous know-how and thereby help to reduce, if not eliminate, the import of professional ferrites, which is entailing an outgo of about rupees 25 lakhs every year in foreign exchange.

The Committee would urge the National Physical Laboratory to supply samples of professional ferrites without delay, which may be got tested, if necessary, from an independent laboratory so as

to reach definitive conclusion about their suitability. The Committee are firmly of the view that the indigenous know-how developed in the national laboratories should be given a fair chance or even a preferential treatment vis-a-vis *foreign collaboration schemes so as to achieve self-reliance at the earliest.*

REPLY OF THE GOVERNMENT

The Director, National Physical Laboratory visited Bangalore during the first week of August, 1966 and held discussions with the Managing Director of ITI. As a result, it was decided that NPL should immediately send (i) samples of torroids (ii) pre-fired ready to press ferrite powder (iii) a blue print giving the dimensions and sketches of the die and punch set to be made for pot cores (iv) a description of the test instruments available at the NPL with their accuracy. Action was immediately taken on the decisions arrived at, and during the month of August, 1966 both pre-fired powder and torroids were sent. During September a scientist from the NPL was sent to the ITI alongwith samples of torroids and pot cores for carrying out tests at the ITI. A few days later, NPL was asked to send another scientist who was familiar with pressing of the cores and torroids as the ITI wanted to try out in their own dies pressing of pot cores which was complied with. Both the scientists returned during the second week of October with pressed samples and test reports on the pot cores that were submitted to the ITI. Certain suggestions have been made by the ITI for improving the quality of the pot cores, particularly from the mechanical point of view, and also for improving the coil former. These are being attended to. The NPL has, on its part, taken the following steps regarding the development of professional ferrites:—

(i) To conform to close tolerances of mechanical size, diamond tools have been ordered, and these are expected to be received very shortly.

(ii) Quotations for 100 ton hydraulic press have been called for.

(iii) Through the good offices of the Senior Industrial Adviser (Engineering) of the DGTD, the NPL has been able to get the assistance of a firm in Faridabad for making the design of the die for pot cores, as well as for trials on their own hydraulic press, till the Laboratory gets its own press. Experiments are being conducted with the co-operation of the firm, and the results are encouraging.

(iv) Additional funds both by way of foreign exchange and rupee funds for obtaining the essential additional equipment have been agreed to.

(v) In order to standardise conditions of sintering and firing, special alumina tubes have been ordered from Germany. A few of these tubes are to be air-freighted, and the rest to be shipped. It is expected that, with the active co-operation of the ITI, and on receipt of the ancillary equipment such as tubes and press, NPL would be in a position to produce the pot cores of the desired size and of acceptable quality.

Action has also been taken to set up a tunnel kiln for producing large quantities of ferrite pot cores for the ITI. The construction of a furnace shed has already been taken in hand, and quotations have been called for the kiln both from Indian furnace manufacturers and from abroad. It is intended to import only the absolutely essential parts such as heating elements and temperature controllers which are not being produced in the country. The rest of the furnace structure will be constructed by NPL from local sources of supply.

The Secretary to the Department of Communications has addressed a letter to the DGSIR saying that the Telecommunication Research Centre in Delhi requires samples which conform in every way both mechanically and electrically to the Philips 3B7 and that NPL should first satisfy themselves that they meet with the specifications fully before submitting samples to TRC. NPL hopes to achieve this with the co-operation and assistance of the ITI.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 22, Para 64)

The Committee note that the Council of Scientific and Industrial Research has established in New Delhi a Central Design and Engineering Unit in 1963 with the object of assisting research and industry in designing and engineering the plants for exploitation of research processes evolved by the Council of Scientific and Industrial Research. The Committee recommend that National Physical Laboratory should take full advantage of this Unit to solve the engineering problems such as automation of the processes developed by the National Physical Laboratory.

The Committee are not sure whether it was correct for the Bharat Electronics Ltd. to have gone in for foreign collaboration for the production of ceramic capacitors on the plea of large scale production and automation of the process when the NPL process was already available to them. The Committee would have thought that instead of entering into agreement with foreign collaboration, the

Bharat Electronics should have asked NPL to modernize and automise their process so as to facilitate large scale production at economic cost. This should not have been insuperable as CSIR has not only the Central Design and Engineering Organisation but also a number of other research institutes, including Mechanical Engineering Research Institute, which could have helped in tackling the problem. Now that the B.E.L. has already concluded an agreement with the French firm (C.S.F.) and may not be interested in commercially exploiting the process developed by NPL, the Committee would like Government to examine whether the know-how developed by NPL for the manufacture of ceramic capacitors should be framed out to any other Indian manufacturer.

REPLY OF THE GOVERNMENT

The recommendation of the Committee has been noted.

As regards farming out of the licence granted to the Bharat Electronics Ltd. on exclusive basis for the production of Ceramic Capacitors on the basis of know-how developed by N.P.L., the matter has been taken up with the B.E.L., Bangalore.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please intimate the latest position regarding farming out of the licence granted to the Bharat Electronics Ltd. for the production of Ceramic Capacitors.

REPLY OF THE GOVERNMENT

A copy of the recommendation of the Estimates Committee has been sent to Shri S. M. Agarwal, Joint Secretary, Defence Production Organisation, Ministry of Defence, New Delhi who is looking after the implementation of the recommendations of Electronics Committee *vide* D.O. letter No. TVR/LCR/67 dated 6-9-67 (copy enclosed). A reply to the communication is awaited.

Extracts from a letter No. TVR/LCR/67 dated 6-9-67 written by Shri T. V. Ramamurti to Shri S. M. Agarwal, Joint Secretary, Defence Production Organisation, Ministry of Defence, New Delhi.

"You may remember I had mentioned about the Estimates Committee's observations and the Lok Sabha's request for a progress report on the directives of the Estimates Committee. In the latest

reply of the Government and Lok Sabha Secretariat's request regarding the latest position, I am sending an extract from the report.

As you are well aware BEL expects to produce only about 11 million Ceramic Capacitors valued at Rs. 22 lakhs in 1974. So, there is a very large shortfall between the Electronics Committee recommendations and the total production planned by BEL. So, there is very reason to release NRDC/CSIR from the "exclusivity" clause and permit us to licence other entrepreneurs in order that the Low Q High K and High Q ceramic capacitors can be produced in the country utilising the indigenous know-how that has already been developed and proved—over so many years."

[*C.S.I.R. O.M. No. 2/4/66-PU dated 7th October*, 1967]

Recommendation (Serial No. 23, Para 66)

The Committee welcome the appointment of committees to go into the questions of development of technical consultancy services and commercial utilisation of indigenous technical know-how. They hope that both the committees will provide useful guidelines for the development and encouragement of indigenous know-how.

The Committee consider that the planning, development and utilisation of indigenous know-how should be a part of the policy to progressively reduce the country's dependence on foreign know-how. The Committee recommend that while according sanction for import of foreign know-how, Government should not only satisfy themselves that the particular indigenous know-how is available or not at the moment but should also assess whether the particular know-how could be developed indigenously within a reasonable time as foreign collaboration agreements also take on an average 2-3 years to materialise, and as it involves a long term commitment of payments in foreign exchange.

Government should also suitably consult other research organisations such as Defence Research and Development Organisation, Railway Research Standards and Design Organisation, Department of Atomic Energy etc., before according sanction to foreign collaboration arrangements, so as to make sure that there is no indigenous know-how available or in the offing for the process. The Committee note that CSIR is represented on the Directorate General of Technical Development. The Committee would like Government to examine the suggestions of CSIR that they should also be represented on the Capital Goods Committee to ensure that foreign equipment

and machinery are not imported where it is or may be made available within the country, within a short period.

REPLY OF THE GOVERNMENT

The above recommendation of the Estimates Committee was forwarded to the Ministry of Industry who have intimated that the question of utilisation of indigenous know-how *vis-a-vis* the need for foreign collaboration is covered by the terms of reference of the Committee set up by the Government under the Chairmanship of Dr. A. Ramaswami Mudaliar.

The Ministry have further stated that when indigenous know-how capable of commercial exploitation is not available, but it is expected that this could be developed later, the question of allowing the import of foreign know-how or otherwise would have to be settled on the merits of each case. If the field is one in which capacity is required urgently for the achievement of Plan targets and the development of the industry could not be delayed, the case for utilising foreign know-how may have to be considered favourably.

While consultation with the various organisation indicated in the recommendation may be useful, the point for consideration would be whether this would not involve avoidable delay in the disposal of foreign collaboration proposals. The efforts of the Ministry are already directed towards streamlining the procedure so as to cut-out the procedural delays which have been the subject of criticism both by Indian and foreign parties. Representations to the CSIR (which is the Chief Co-ordinating Agency for Civilian research in the country) and to the Department of Atomic Energy have already been given by the Ministry on the Foreign Agreements Committee in order to provide the required safeguard and to ensure that indigenous know-how is not overlooked.

The CSIR is also invited to the meetings of the Capital Goods Committee since February, 1966.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 24, Para 67)

The Committee recommend that while negotiating foreign collaboration agreements, Government should keep in view the advantages of going in for outright purchase of foreign know-how in preference to 'on royalty basis'.

REPLY OF THE GOVERNMENT

The Ministry of Industry, to whom this recommendation was referred, have pointed out that the advantage of going in for outright purchase of foreign know-how in preference to 'on royalty basis' is always taken into consideration while examining foreign collaboration agreements. It may however be mentioned that royalties based on a certain percentage of sales are generally agreed to in cases where the technical assistance of the foreign companies is required for a number of years. In such cases, if the know-how is purchased outright, the foreign firm loses interest in the Indian Company's products and the latter would not be able to get the benefit of continuous research and latest developments in the know-how. Outright purchases would be possible if the goods are to be manufactured under a foreign company's trade-mark or the know-how is not required on a continuous basis. Even in cases where out-right purchase of know-how may be considered advantageous, the foreign collaborator may not sometimes be willing to sell his know-how on that basis.

This matter also came up for discussion at the 52nd meeting of the Governing Body of the CSIR held on 19th November, 1966 and the Governing Body was of the view that "It was preferable to make outright purchases of technical know-how and designs rather than obtain know-how under licence although this may mean higher payment in the beginning. Collaboration agreements, as far as possible, should be such that Indian scientists and technologists are actively associated in the planning and execution of projects." These views are also being forwarded to the Ministry of Industry for their consideration.

[*C.S.I.R. O.M. No. 2/4/66-PU dated 7th November, 1967*]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please intimate the views of the Ministry of Industry in the matter.

REPLY OF THE GOVERNMENT

The Ministry of Industrial Development and Company Affairs *vide* their D.O. letter No. IP&FC.5(22)/66 dated the 28th October, 1967 have stated as under:—

"The Mudaliar Committee on Foreign Collaboration which had been set up by the Government to go into the question

of utilisation of indigenous know-how *vis-a-vis* the need for foreign collaboration has, in its Report, examined the comparative advantages of various forms of foreign collaboration. While taking decisions on various recommendations of the Committee, Government have agreed with the view that in the case of processes which are long established and are unlikely to be overtaken in the near future by technological obsolescence, out right purchase of design, know-how etc. would be more advantageous than any other form of collaboration."

[*C.S.I.R. O.M. No. 2/4/66-PU dated 7th November, 1967*]

Recommendation (Serial No. 25, Para 68)

The Committee hope that Government will take an early decision in regard to the transfer of the National Research Development Corporation from the administrative control of the Ministry of Education to a more suitable Ministry so that it would fulfil the purpose for which it was originally set up.

REPLY OF THE GOVERNMENT

The Ministry of Education have intimated that the question of transfer of National Research Development Corporation from the Ministry of Education to another suitable Ministry has been referred to the Ministry of Finance. The decision of the Ministry of Finance in the matter is awaited.

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February, 1967*]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please intimate the decision of the Ministry of Finance in the matter.

REPLY OF THE GOVERNMENT

No decision has so far been arrived at in the matter by the Ministry of Finance.

[*C.S.I.R. O.M. No. 2/4/66-PU dated 19th October, 1967*]

Recommendation (Serial No. 26, Para 69)

The Committee are surprised that the Joint Standing Committee for Research and Industry which was sponsored by the CSIR itself

in 1956 with laudable objectives for forging coordination with D.G. T.D. should have been put into cold storage even though the recommendation of the Estimates Committee for its effective functioning which was made in 1960 had been accepted by Government. The committee note that while CSIR is trying for representation on committees of D.G.T.D. so as to farm out fruitful researches for commercial exploitation, it could not make any use of the machinery set up by itself for the same purpose. The Committee recommend that the Joint Standing Committee should be activised and should deliberate at least twice a year and should also periodically review its previous recommendations so as to ensure that they are expeditiously implemented.

REPLY OF THE GOVERNMENT

The recommendation of Committee has been noted.

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 28, Para 73)

The Committee note that the income derived from testing and certification by some Divisions is less than even 10 per cent of the annual expenditure incurred on them. The position in respect of other Divisions, for which information has not been supplied to the Committee, is presumably no better. The Committee are unable to appreciate why accounts of expenditure incurred on testing and work under the two broad heads of routine testing and developmental testing is not being maintained. They would like such cost accounting to be introduced with immediate effect. As far as developmental testing is concerned, the Committee would like to stress that the expenditure incurred on each developmental test should be carefully reviewed by the Director in consultation with the Head of the Division concerned at intervals of three months so as to ensure that no infructuous expenditure is incurred.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been noted and is being implemented as far as practicable.

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 29, Para 73)

It is surprising that the schedule for testing charges for different divisions which was laid down by the National Physical Laboratory several years ago has not been revised so far. The Committee hope

that the testing charges would be suitably reviewed at an early date by the departmental committee which has been appointed recently by N.P.L. The Committee consider that testing charges should be fixed in such a manner as would make them commensurate with the expenditure incurred in this regard consistently of course with what the industry can bear, and the charges should be reviewed periodically.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been noted.

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 30, Para 74)

While the Committee appreciate the developmental work done in the National Physical Laboratory for testing of clinical thermometers, they feel that with the development of the testing instruments and the stabilization of the technique for testing, it should be possible to transfer the work of routine testing to Indian Standards Institution within one year.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been noted. It will be implemented when necessary experience has been gained by the NPL and the ISI staff in testing of Clinical Thermometres on a large scale.

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 31, Para 80)

(i) *The Committee note that the Development-cum-Production Unit for Electronic Components has been able to make some profit in* 1965-66. *They feel that there is scope for effecting economy by improving the percentage of rejections of antenna rods. They would also stress that research efforts should be intensified to put to profitable use the antenna rods worth Rs.* 37.500 *which were rejected in* 1964-65.

(ii) *The Committee would like to emphasise that production of I.F. Cores and Porcelain Rods may be taken up only after firm orders therefor have been received. They have, no doubt, that the commercial experience gained in the production of antenna rods would be put to good use while taking up the manufacture of I.F. Cores and Porcelain Rods.*

REPLY OF THE GOVERNMENT

The Development-*cum*-Production Unit for Electronic Components (DPEC) sub-committee went into the question of recovering all rejected rods which were of lower quality. The labour cost involved which comes to about two-thirds of the value of the rods, cannot naturally be recovered, but the material has been reprocessed and utilised in the manufacture of antenna rods.

The National Physical Laboratory is only making IF cores after receiving firm orders from the radio industry. Actually the Laboratory has yet to complete the orders so far received and that is why departmental production is being continued both of IF cores and antenna rods. It is expected that by March, 1967, the Laboratory will be able to fulfil the commitments.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 32 Para 82)

The Committee regret to note that no action has so far been taken by the National Physical Laboratory for the commercial exploitation of the process on 'Simultaneous Inter-communication System', which was completed successfully in 1963.

The Committee feel that National Physical Laboratory should have taken patent rights soon after the successful development of the 'Simultaneous Inter-Communication System' and approached the National Research Development Corporation for farming out the process for commercial exploitation. The Committee recommend that steps should now be taken in this direction immediately.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been noted and necessary steps are being taken for commercial exploitation of the process on 'Simultaneous Inter-communication System.'

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February*, 1967]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please intimate the present position regarding commercial exploitation of the process on Simultaneous Inter-Communication System.

REPLY OF THE GOVERNMENT

A patent application for "Simultaneous Inter-Communication System" has been filed with the Controller of Patents & Designs, Calcutta. The National Research Development Corporation has also been requested to explore the possibilities of the commercial utilisation of the process by the industry.

[*CSIR O.M. No. 2/4/66-PU dated 19th October*, 1967]

Recommendation (Serial No. 33, Para 84)

The Committee are not happy about the existing arrangements for collaboration merely on personal level between the Solid State Physics Division of the National Physical Laboratory and the Solid State Physics Laboratory of the Ministry of Defence. The Committee recommend that to avoid infructuous duplication of research efforts between these two institutions, there should be closer collaboration on institutional level.

REPLY OF THE GOVERNMENT

The Director of the Solid State Laboratory of the Ministry of Defence is a member of the Panel of Consultants of the NPL for the Solid State Division, and as such close collaboration exists between the two organisations. The Director, NPL is also invited to serve on the Committees of the Solid State Laboratory and is thus posted with the uptodate position of the work carried on there. The scientists of the two laboratories interchange visits also.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 37, Para 104)

The Committee are disappointed at the work of the Heat and Power Division particularly in the Solar Energy Programme. India is very fortunately placed in the matter of solar energy and they feel that it should not be beyond scientific ingenuity to harness this energy profitably for industrial, commercial and domestic purposes as

has been done by scientists in many other countries like U.S.A., Japan, Israel, etc. The Committee would in particular stress the need for intensifying research in solar still, water heater and turbine which could prove such boons in the arid zones of the country e.g., Rajasthan, Gujarat etc. The Committee would urge in this connection closer collaboration between the National Physical Laboratory and the Central Salt and Marine Chemical Research Institute (C.S.I.R.), the Central Arid Zone Research Institute (Indian Council of Agricultural Research) and the Power Research Institute, Bangalore (Ministry of Irrigation and Power).

REPLY OF THE GOVERNMENT

The working of the Heat & Power Division of N.P.L. was reviewed by the Sub-Committee of the Executive Council of the Laboratory which met on 14th—15th March, 1963 and subsequently by the Executive Council on 29th April, 1963. The Executive Council endorsed the views of the Sub-Committee that in view of lack of funds and properly trained staff, work on Solar Energy may be discontinued excepting for certain selected projects like development of solar water heaters and solar stills.

As regards collaboration between the National Physical Laboratory, Central Salt & Marine Chemicals Research Institute, Central Arid Zone Research Institute (I.C.A.R.) and Power Research Institute, Bangalore, action has been initiated.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please intimate the concrete steps taken in the matter.

REPLY OF THE GOVERNMENT

The Central Salt and Marine Chemicals Research Institute, Bhavnagar, the Arid Zone Research Institute, Jodhpur and the Power Research Institute, Bangalore were contacted to find out the work on Solar Energy Utilisation being undertaken in these laboratories.

The Director, Power Research Institute (Central Water & Power Commission, Ministry of Irrigation & Power) Bangalore informed that they have no programme of investigations relating to Solar Energy Utilization.

Shri C. P. Bhimaya, Director, Central Arid Zone Research Institute (Indian Council of Agricultural Research) Jodhpur, has informed that work on Solar Still and on Wind regime was being pursued in the Institute's Climatology Section but this work is of a preliminary nature. No results have been published. However, in the Fourth Plan period, work on solar energy utilisation would constitute the use of solar cookers, stills etc. The Institute would gladly take up these studies in collaboration with the National Physical Laboratory who have already done some researches in these nelds.

The Director, Central Salt & Marine Chemicals Research Institute (CSIR) Bhavnagar informed that the work of Utilization of Solar Energy was confined primarily to Water Desalination. A Principal Solar Radiation Station was recently set up in collaboration with the Meteorological Department of Government of India with the object of further studies in the utilization of Solar Energy for various purposes. This Institute is now organising a Conference on Water Desalination to be held on 16th, 17th and 18th November, 1967 when a paper giving details of work conducted in National Physical Laboratory on water desalination would be presented. Secondly the formation of a working group on Solar Energy measurement and utilisation would be discussed during the course of this Symposium. The object of formation of this group is to pursue effectively and to coordinate the various projects in the field of investigation of solar energy measurements and its utilisation and exchange of views between the various workers in the country.

[*CSIR O.M. No. 2/4/66-PU dated 7th October, 1967*]

Recommendation (Serial No. 39, Para 106)

The Committee are not convinced that a full-fledged Theoretical Physics Division is necessary for the National Physical Laboratory. They note that the main work of the Theoretical Physics Division is to train the new entrants, prepare research scholars for Ph.D. work and solve the mathematical problems arising out of the day-to-day working of the National Physical Laboratory. The Committee have been informed that National Physical Laboratory has recently entered into an agreement with the University of Delhi under which scientists of the National Physical Laboratory give regular lectures at the University of Delhi. The Committee would like the National Physical Laboratory to take the assistance of University of Delhi as necessary, for its training programme as well as for solving mathematical problems connected with research work. The Committee think that such collaboration between National Physical Laboratory and University of Delhi would be in consonance with the recom-

mendations made by the Third Reviewing Committee of CSIR (1964) that "the general policy of the CSIR should be to develop mutual confidence and reliance between the CSIR and its institutions and the universities." As regards the fundamental work of the Division on high energy physics, plasma physics, etc. which is also being done at other institutions, the Committee would draw attention of the National Physical Laboratory to the observations of the Third Reviewing Committee that "the bulk of the basic work of a CSIR laboratory should be related to and form the background of its applied work However, at present largely for historical reasons, there are groups in National Physical Laboratory, which are concerned with 'pure basic work' with little or no connection with applied work. We feel that emphasis should be changed over a period of time towards applied work."

The Committee consider that the number of research scholars being admitted in the Laboratory for preparing Ph.D. thesis, which has no direct bearing on applied research work, should be severely curtailed.

The Committee suggest that the functions and the staff strength of the Division of Theoretical Physics should be carefully reviewed by the CSIR in the light of the above considerations.

REPLY OF THE GOVERNMENT

The Executive Council of NPL at its meeting held on 26.8.66 decided to reduce the number of divisions of the Laboratory from 22 to 14. In the process the Theoretical Physics Division, has been merged with the re-organized Basic Physics Division, which consists of the erstwhile Divisions of Theoretical and Low Temperature Physics. There is already active colloboration between the Delhi University and the National Physical Laboratory. The recommendations of the Estimates Committee in this regard have been noted and are already being implemented, and the work of the reorganised Basic Physics Division has been reoriented so as to fall within the purview of the main objective of tht NPL. Barring a few exceptions, most of the project now being undertaken are of an applied nature the results of which will, ultimately, be capable of being utilised in solving industrial problems or used by Defence.

As regards the number of research scholars, they are generally taken with a view to training them for a research career and often

times it so happens that their subject is of fundamental nature. Efforts are, however, being made to take only such scholars in future whose subjects are of an applied character.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*].

Recommendation (Serial No. 40, Para 109)

The Committee are concerned to find that a subject like "Utilisation of Fish Body Oil" which has no relation whatever to the objectives of N.P.L. was taken up as a research project in the Laboratory. This is indicative of the lack of proper selection of research projects in the laboratory. The Committee would like the Council of Scientific and Industrial Research to ensure that such unconnected and isolated subjects of research which have no bearing on the objectives of National Physical Laboratory are dropped forthwith.

The Committee also find it difficult to believe that even after dropping several projects and reorientation of the work or the Analytical Chemistry Division, as recommended by the Executive Council in October, 1964, the National Physical Laboratory have not been able to effect economy in the working of the Division; on the other hand the strength of the Division has been increased. As the Materials Division for which the Analytical Chemistry Division is expected to render considerable assistance, is yet to be set up in the National Physical Laboratory, the Committee recommend that the staff position of the Analytical Chemistry Division should be reviewed immediately so as to effect economy.

REPY OF THE GOVERNMENT

The recommendation contained in the first para has been noted. The project on Utilisation of Fish Body Oil has been transferred to the Regional Research Laboratory, Hyderabad and the project on "Rain and Clouds Physics Research" is also being transferred to the Indian Meteorlogical Department from 1st April, 1967 as stated in reply to recommendation at S. No. 44 in Appendix XII of the Report.

As regards para 2 of the recommendation, the Analytical Chemistry Division of N.P.L. has been merged into the newly formed Material Analysis Division where work on chemical and physical analysis (like X-ray, infrared spectroscopy, electron miscroscopy etc.) would be carried out.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*].

Recommendation (Serial No. 41, Para 111)

The Committee regret that an x-ray generator was allowed to go into disuse after the death of the first Director of the N.P.L. and that it took more than two years to locate the various parts and put it back into working condition. The Committee would like the Laboratory to ensure that proper arrangements are made for the upkeep of the expensive equipment.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee for the upkeep of expensive equipment has been noted.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*].

Recommendation (Serial No. 43, Para 113)

The Committee are surprised that even after 15 months of the decision of the Executive Council, no action has been taken by the N.P.L. in assessing the financial implication, time and personnel required for the execution of the projects on 'Vacuum Tubes' and 'High and Ultra-high Vaccum Practice' and the utility of the projects.

The Committee need hardly stress that after a proposal is approved by the Executive Council in principle, full details thereof should be worked out, at an early date, to give effect to the decision. They would like National Physical Laboratory to take early action in the matter.

REPLY OF THE GOVERNMENT

The Estimates Committee's recommendation has been noted. It has, however, not been possible to take up the two projects in question for want of properly trained staff and equipment.

[*CSIR U.O. No. 2/4/66- PU dated 22nd February, 1967*]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please intimate whether utility of the two projects has been assessed and if so when it is proposed to take them up.

REPLY OF THE GOVERNMENT

The matter was discussed at the Executive Council meeting of the National Physical Laboratory, New Delhi held on 11.9.1967 and

it was decided that a detailed scheme be prepared for consideration of the Executive Council at its next meeting.

[*CSIR O.M. No. 2/4/66-PU dated 7th October, 1967*]

Recommendation (Serial No. 44, Para 118)

The Committee are surprised to find that though the decision to transfer the Rain and Cloud Physics Research Unit to the Meteorological Department was taken by the Executive Council about two years ago, it has not yet been implemented. As the work of this Unit is not directly connected with National Physical Laboratory they would urge Government to arrange for the transfer of the Unit to the Meteorological Department without further delay.

REPLY OF THE GOVERNMENT

It has been decided to transfer the Rain and Cloud Physics Research Unit to the India Meteorological Department from the next financial year (that is 1st April, 1967).

[*CSIR U.O. No. 2/4/66- PU dated 22nd February, 1967*]

Recommendation (Serial No. 45, Para 120)

The Committee are concerned at the leisurely manner in which the details for setting up the Material Division are being worked out, particularly when Materials Division is, stated to be one of the major projects included in the Fourth Plan proposals of the National Physical Laboratory. In the working out of the detailed proposals, the Committee would stress the need for ensuring close collaboration with other Laboratories e.g., National Metallurgical Laboratory, National Chemical Laboratory, Central Glass and Ceramic Research Institute which are working in the field and to set time targets for development of materials with particular reference to those which are being imported at present.

REPLY OF THE GOVERNMENT

The Materials Division has started functioning at National Physical Laboratory during the current year (1966-67). The recommendation of the Estimates Committee for ensuring close collaboration with other National Laboratories/Institutes for example, National Metallurgical Laboratory; National Chemical Laboratory; Central Glass & Cera-

mic Research Institute etc. which are working in the field, will also be kept in view.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 46, Para 121)

The Electronics Committee have indicated in their Report a possible scheme for the development of computer technology and the establishment of a computer industry in India during the next decade. The Committee would like Government to take an early decision in the matter. The Committee feel that at present the work is being done by several units without much coordination. They suggest that Government should assign specific roles for computer research to the research institutions under C.S.I.R., Atomic Energy Establishment, Universities etc.

The Committee have no doubt that full advantage would be taken of the work being done at Jadavpur University which has developed a computer indigenously.

REPLY OF THE GOVERNMENT

The Council of Scientific and Industrial Research appointed a Committee of Experts under the Chairmanship of the D.G.S.I.R. and including representatives of interested Organisations to consider the development of computer technology in India. The Committee at its meeting held on 20.7.66 made the following recommendations:—

(i) The DGSIR may take up the question with the Scientific Advisory Committee to the Cabinet with a view to setting up a Group to ensure progress in development and manufacture of computers, components, peripherals etc. needed for the computer industry in India, if not already done.

(ii) Research and Developmental Centres may be started in the country where research can be done in computer technology including developmental work. The types of computers to be developed be decided by the above mentioned Working Group.

(iii) There is a definite need for small and medium computers in the educational and research institutions. The ability to use the facilities profitably and the total resources that can be allocated would be guiding considerations in individual cases.

(iv) There should be some selected places like the Tata Institute of Fundamental Research, NPL etc., where large scale facilities may be set up and where the larger problems can be routed.

(v) The import of computers and its components etc. for the present needs and developmental work on computers keeping future needs in view, should go on side by side.

A list of participating organisations who attended the meeting is enclosed for information (Appendix II).

The recommendations mentioned are being examined with a view to implementation.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 47, Para 124)

The Committee regret the inordinate delay of three years in setting up a committee to review the working of the Central Workshop of the National Physical Laboratory, which was suggested by Prof. Blackett, as early as February, 1963.

The Committee consider that the role of a Workshop in the National Physical Laboratory is primarily one of service to the Divisions of the Laboratory and it should not be enlarged to include service to other Government Departments and Institutions except in case of some sophisticated instruments whose repairs and manufacture is not available elsewhere in the country. They suggest that the Workshop may be reorganised keeping this central role in view. If it is necessary to undertake manufacture of specialised equipment and instruments for other organisations e.g. Universities, other research Institutions as a regular measure, the Committee would suggest that Government should decide in consultation with C.S.I.R., the most appropriate organisation e.g., Central Scientific Instruments Organisation, where it could be undertaken. The machinery and the staff of the Workshop which are found surplus to the requirements of the National Physical Laboratory may also be considered for transfer to that organisation.

The Committee are surprised that in a Workshop with this limited role, the wage bill of labour should be Rs. 1·50 lakhs per year and the over-heads should account for another Rs. 1.00 lakh. The Committee would stress the need for effecting economy and in particular, the

introduction of proper costing procedure so as to distinguish clearly between the cost of maintenance and manufacture.

The Committee need hardly stress that machines which are obsolete or surplus to requirements should be disposed of at an early date so as to reduce unnecessary recurring expenditure which is being incurred on staff engaged for their operation and maintenance.

REPLY OF THE GOVERNMENT

The Executive Council of the N.P.L. appointed a Workshop Reviewing Committee at its meeting held on 9th September, 1965. The report of the Workshop Reviewing Committee which met on 15-16 February, 1966 was considered by the Executive Council of the Laboratory at its meeting held on 28th February, 1966. The relevant extracts from the proceedings of the Executive Council are quoted below:—

> "While accepting the recommendations, the Council decided that the objects of the Central Workshop should be fabrication of specialised and developmental type of equipment which cannot be made outside. Service maintenance should be organised centrally. It was suggested that instead of forming Divisional Workshops, it might be advisable to allot lathes and equipment to a group of scientists for routine type of work. It was, however, left to the discretion of the Director to work out the details. This work should not, however, entail the creation of additional posts."

The Executive Council at its meeting held on 26th August, 1966 noted the following further action taken by the N.P.L. in regard to the working of the N.P.L. Workshop:

> "Efforts are being made to assess the requirement of the divisions pertaining to machines, tools and staff for carrying out petty and routine jobs for a group/s of scientists in the laboratory. Seven lectures on Machine Drawing for the benefit of the scientists of the NPL have been organised for a period of over two months. The topics of lectures on Machine Drawing were Principles of Orthographic Projections, Exercise in reading projections, Sections and Conventions, Representation of some common machine components, Dimensioning and Conversions and Exercises in Machine Drawing. Revised costing procedure as recommended by the Workshop Reviewing Committee held on 15th and 16th February, 1966 at N.P.L.,

has been introduced. Breakdown and maintenance work is now being carried out in the Central Workshop."

The Executive Council also recommended that the practice of delivering lectures on Machine Drawing for the benefit of the scientists of the laboratory be continued as a regular feature.

As regards the maintenance of separate accounts, it may be stated that it is rather difficult to maintain separately cost of maintenance and cost of manufacture as it would lead to more accounting work. The new costing procedure as recommended by the Workshop Reviewing Committee has been implemented, as reported in paragraph 124 of the Report.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please furnish specific reply to the Committee's suggestion (regarding undertaking manufacture of specialised equipment and instruments for other organisations) that "Government should decide in consultation with CSIR, the most appropriate organisation e.g. Central Scientific Instruments Organisation, where it could be undertaken."

REPLY OF THE GOVERNMENT

The Central Scientific Instruments Organisation, Chandigarh is already fabricating specialised equipment and instruments for other organisations and is prepared to do it on a larger scale depending upon the availability of funds, Staff and materials.

[*CSIR O.M. No. 2/4/66-PU dated 7th October*, 1967]

Recommendation (Serial No. 48, Para 125)

The Committee are concerned to note that some 'war disposal' machinery and equipments are lying unopened even after more than ten years of their receipt in the National Physical Laboratory. They are unable to appreciate why the National Physical Laboratory with such a large number of administrative and technical staff could not find it possible to open these crates, identify the machines and decide whether they were to be retained in the National Physical Laboratory or to be given to some other organisation by Government who could put them to use.

The Committee would like CSIR to have a thorough inventory made of all the surplus machinery and equipment lying unused in the National Physical Laboratory and other laboratories and to arrange for their proper disposal in consultation with the Ministries of Industry, Railways and Defence. The Committee would also like to draw attention to recommendation made in para 123 of their 91st Report on the South Eastern Railway wherein they have recommended that war surplus machinery lying unutilised in the Railway Workshop should be brought into use at an early date.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been noted and necessary action initiated by N.P.L. Most of the equipment in the Laboratory which are obsolete, have been disposed of, and surplus equipment has been given to educational institutions and Government Departments.

Instructions have also since been issued to all the National Laboratories/Institutes of the CSIR requesting them to compile an inventory of all surplus machinery and equipment which is not likely to be utilised by the Laboratory/Institute and to take suitable steps for their disposal keeping in view the recommendation of the Estimates Committee.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967].

Recommendation (Serial No. 49, Para 126)

The Committee feel that there is a general tendency for keeping unrewarding research projects on the books either for reasons of prestige on because of hopes that some efforts and money might produce some eventual rewards and justify the money spent on a project. This appears to be particularly so in the case of National Physical Laboratory as the Committee find that even after recommendations had been made by Prof. Blackett, the Executive Council of the National Physical Laboratory and the Third Reviewing Committee of the C.S.I.R. for dropping and recasting of the projects, no serious attempt appears to have been made in this direction. The Committee consider that if resources on research projects are to be utilised effectively and to the best advantage, it is essential to review their progress from time to time systematically and vigorously. Apart from the occasions that such reviews provide for discussion and guidance, they also offer good opportunities for exercising control and ensuring that the resources are not being expended on

research where progress is unlikely because of lack of new ideas or the necessary techniques. The Committee recommend that reviews of all research projects should be conducted at least quarterly by the Director of the laboratory in conjunction with the Head of the Division/scientist concerned with reference to the progress made, expenditure incurred, the anticipated expenditure and time required to achieve results so as to take necessary steps for early fruition, or failing that abandon the unrewarding projects at the earliest possible time. The Committee would further suggest that the results of such reviews should also be communicated to the C.S.I.R. half-yearly to keep it informed of the overall progress made in the research projects.

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been circulated to all the National Laboratories/Institutes of the CSIR with the request that a review of all the Research Projects in the Laboratory/Institute may be conducted at least once in a quarter and the results of such reviews communicated to the CSIR half-yearly.

As regards the NPL, the Director of the Laboratory is reviewing all the projects with the leaders concerned, regarding the progress made, the difficulties encountered, both technical and administrative, and to find out the ways and means to iron them out.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*].

Recommendation (Serial No. 50 Para 127)

The Committee consider that it would be useful to have a periodical evaluation of the research work of the National Physical Laboratory every five years by an independent committee consisting of eminent physicists and representatives of user departments who are not members of the Executive Council of the Laboratory. In the opinion of the Committee such an evaluation would provide an objective and independent assessment of the work of the laboratory

and would act as a stimulant to its functioning. They further recommend that this system of evaluation by an independent committee, should be applied to all the research laboratories and institutes under the C. S. I. R.

REPLY OF THE GOVERNMENT

The C. S. I. R. has an in-built system by which the scientific and financial implications of the schemes/projects incorporated in the 'Programme of Research' of a Laboratory are examined and assessed periodically. The system is that the Director of a Laboratory in consultation with his scientist, colleagues formulates programme of research of the laboratory. The programme of research so formulated is considered by the Executive Council of the Laboratory which includes outside scientists and industrialists connected with the field of research of the laboratory. The Executive Council is assisted in its work by Sub-Committees, namely, the Scientific Sub-Committee and the Finance and Building Sub-Committee. These Sub-Committees scrutinise the scientific programme and their financial implications and their recommendations are considered by the Executive Council.

Appointment of a "Reviewing Committee" for periodical assessment of work of the CSIR is provided under Rule 57 of the Rules and Regulations of the CSIR which is given below:—

> "The President shall have the authority to review periodically the work and progress of the Society, to order enquiries into the affairs of the Society, and to pass orders on the recommendation of the reviewing or enquiry committee."

So far, three Reviewing Committees have been set up by the CSIR under this Rule. The Third Reviewing Committee which was appointed in 1963 under the Chairmanship of Dr. A. Ramaswami Mudaliar, has made the following recommendations in its Report regarding "Reviews of CSIR Activities":—

> "We conclude this Report by making a suggestion on the method of review. The reviews of the CSIR should be related to the Five Year Plans and should be started early in the beginning of the closing year of each Plan period.

This would enable the Reviewing Committee to assess and evaluate the work done during the five years and project its ideas to the orientation needs or changes that could be suggested for adoption in the forthcoming Plan.

We also feel that in addition to the overall review of the CSIR, individual institution should be reviewed by a panel of scientists once in every quinquennium. Such a review could usefully precede the review by the Reviewing Committee which would then take into cognisance the recommendations made in respect of individual research institutes."

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please state clearly whether the recommendation has been accepted or not.

REPLY OF THE GOVERNMENT

While the Council of Scientific and Industrial Research accepts the recommendation in principle, the period and the manner in which a review of a research laboratory should be conducted are matters which should be left to the authorities who are responsible for the policy and direction of the research laboratory. In an organisation like the C.S.I.R., with a wide variety of laboratories under its control, there are many factors which are to be taken into consideration and the type of review may vary from subject to subject.

[*CSIR O. M. 2/4/66-PU dated 24th October, 1967*]

Recommendation (Serial No. 51 Para 128)

The Committee cannot too strongly emphasise the need for closer collaboration among the scientists of the National Physical Laboratory in sharing their experience on projects of common interest and sharing their equipments, which will evidently lead to better out-put. The Committee have already observed in para 20 that excessive compartmentalisation of work in the National Physical Laboratory is due to the existence of a large number of Divisions and each division being unduly conscious of and eager for self-sufficiency. The Committee recommend that the CSIR should take effective steps to stream-

line the overall working of the National Physical Laboratory and bring about the much needed coordination amongst its various Divisions.

REPLY OF THE GOVERNMENT

The number of Divisions at N. P. L. has been reduced by the Executive Council of the Laboratory from 22 to 14 (including the Rain & Cloud Division, which is under process of transfer to the India Meteorological Department, Poona). Further, the work of the National Physical Laboratory is increasingly oriented on project basis which has helped in bringing scientists of various disciplines together and in avoiding compartmentalisation.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 52 Para 129)

The Committee note that 30 laboratories have now been set up by C.S.I.R. in different disciplines. In view of the fact that there is inter-relation and similarity in the work of some of the Divisions of National Physical Laboratory and other Institutions of the CSIR as well as of other research institutes and departments which have come into being after the NPL, the Committee would urge closer co-operation and coordination between them especially while selecting problems for research. The Committee welcome the steps taken by CSIR in organising inter-laboratory conference. They would further suggest that steps should be taken by CSIR to appoint conveners for each major item of research work which is being done in more than one laboratory so as to bring about close coordination. The Committee would also suggest that the NPL may drop some of the subjects for which separate laboratories and institutions have been set up.

REPLY OF THE GOVERNMENT

The National Physical Laboratory, New Delhi has taken necessary steps to see that there is no avoidable duplication of work carried out in the different laboratories. The question of inter-laboratory collaboration was one of the subjects discussed in depth at the Directors Conference held at Bangalore on 4-5 July, 1966. A Study Group appointed for this purpose made the following recommendations:—

1. Every laboratory should circulate its project proposals to other laboratories at the formative stage, and to seek comments regarding desirable collaboration.

2. It is hoped that in course of time, the identification of various subjects in which different laboratories have common interest, will be brought about automatically as a result of giving such information and seeking comments.

3. It will then be necessary to form common expert groups of each subject consisting of an expert from each concerned laboratory as well as an expert or two specialised in that field from outside the C.S.I.R. by common consent.

4. These expert groups would then be assumed to advise on a continuing basis to various laboratories concerned as to the manner in which laboratory inter-action can best take place in the background of experts as well as facilities available in various laboratories.

5. The report of the expert group would be made available to the Executive Council by the concerned laboratory.

6. The groups would normally be expected to meet once or twice a year at each laboratory concerned, for a couple of days at a time.

7. It is hoped that these groups will also bring about the "get together" of workers on the subject concerned, as required.

These were approved by the Directors Conference which has recommended in addition the following:—

1. The initiative for such inter-laboratory collaboration should come from the Directors of the Laboratories/Institutes concerned.

2. The laboratories concerned with the assistance of the I.L. & E.O. may meet from time to time to consider overlapping projects.

3. Inter-laboratory collaboration would be more meaningful in the case of important and major projects where energetic and concentrated attack by three or four laboratories would yield quicker results.

The recommendations are being implemented as far as possible.

[*CSIR U.O. No. 2/4/66-PU dated the 22nd February*, 1967.]

Recommendation (Serial No. 53, Para 133)

The Committee appreciate that a number of guest workers from various universities took advantage of the facilities at N.P.L. They suggest that guest workers from other universities, particularly those having Advanced Centres in Physics, should also be encouraged to avail of the facilities at N.P.L.

REPLY OF THE GOVERNMENT

The specialised facilities available for research work in the NPL are being brought to the notice of the research workers in the Universities through the NPL Technical Bulletin which is being published once in a quarter. The research workers would be given every encouragement to solve their problems with the use of specialised equipment available in the Laboratory.

[*CSIR U.O. No. 2/4/66-PU dated the 22nd February, 1967*].

Recommendation (Serial No. 54 Para 137)

The Committee regret to note that the meetings of the Executive Council, which is the main body responsible to direct the research programmes of the National Physical Laboratory, have not been held at least twice a year as provided for in the Rules, and on an average the Executive Council has not met even once a year. Fourteen meetings in a period of 16 years can hardly provide the necessary guidance and supervision over the working of the Laboratory which is expected from such a body. Moreover the duration of the meetings of the Executive Council which is usually a day at a time, can hardly allow sufficient time to the Members to probe into the matters placed before them. The Committee consider that the past performance of the National Physical Laboratory may in part be attributable to the inadequate number of times the Executive Council has met. The Committee consider that the Executive Council should function energetically and effectively so as to give a clear lead in the formulation of the research programmes of the National Physical Laboratory and to watch zealously the progress made in research projects in implementation of its decisions. The Committee urge that the Executive Council should meet not less than twice a year, but it would be preferable if it meets once a quarter so as to deliberate promptly and critically over problems and give guidance.

REPLY OF THE GOVERNMENT

The recommendation of the Committee has been noted. The meetings of the Executive Council of the National Physical Laboratory will be held at least twice a year as provided in the Rules.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 56, Para 139)

It is well known that the success of an organisation depends to a large extent on the direction and guidance provided by its Head, who should be a man of standing and proven administrative ability and possessing expert knowledge and experience of the subject matter dealt with by the organisation. This is all the more important in the case of research laboratories where senior scientists work. The Director of such a laboratory should have the ability to inspire team work and set a high example by his own dedication to research work. The Committee consider it extremely unfortunate that the NPL remained without an effective Director for a period of about 4 years i.e. *from* 1961 to 1965. *This led to uncertainties about its future programmes and policies which affected the general morale of the scientists working in the N.P.L. The Committee hope that Government/ CSIR would benefit from the said experience of National Physical Laboratory which has affected its reputation to a considerable extent. The Committee fully endorse the recommendation of the Reviewing Committee that the Directors of national laboratories be appointed as expeditiously as possible to ensure the proper functioning of the research organisations and interim and ad hoc arrangements extending over long periods should be avoided.*

REPLY OF THE GOVERNMENT

The recommendation of the Estimates Committee has been noted.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 57 Para 140)

The Committee stress that National Physical Laboratory should make concerted efforts to remove the imbalance between the scientific staff and non-scientific staff existing in the Laboratory and effect economy by reducing the administrative and Class IV staff to the barest minimum. The Committee would like C.S.I.R. and the Executive Council of National Physical Laboratory to take urgent action in the matter. The Committee would like C.S.I.R. to lay down norms about the proportion of scientists, technical and non-technical staff for each laboratory so that the strength of staff is regulated accordingly.

REPLY OF THE GOVERNMENT

1. The suggestions of the Estimates Committee have been noted and necessary action is being taken by the N.P.L. to reduce existing

imbalance between the scientific and non-scientific staff and to effect economy by reducing the administrative and Class IV staff to the barest minimum.

2. The recommendation of the Estimates Committee regarding laying down of norms for fixation of staff strength has been forwarded to the Heads of the National Laboratories/Institutes of the CSIR for consideration and recommendation of their respective Executive Councils.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 58 Para 141)

The Committee regret that a large number of scientists, have left the National Physical Laboratory during the last four years, thereby adversely affecting the progress of research work in the laboratory. The Committee feel that this may partly be due to lack of proper scientific atmosphere in the laboratory. The Committee would urge that National Physical Laboratory should immediately take remedial measures to retain the scientists engaged in specific projects so that the important research projects which were being carried out by these scientists, may continue without interruption.

REPLY OF THE GOVERNMENT

Care has been taken to see that the work on the various projects is not interrupted by having a group of scientists to work on them. This will ensure the continuity of the project even if one or two scientists working on the project, leaves the laboratory.

[*CSIR U.O. No. 2/4/66-PU dated the 22nd February, 1967*].

Recommendation (Serial No. 60 Para 143)

The Committee note that while many C.S.I.R. laboratories are bringing out annual reports and technical bulletins to inform the scientists, industrialists and the public of their activities and the facilities they can extent, National Physical Laboratory has not done so till very recently in spite of the directive of the C.S.I.R. The Committee, however, note that the National Physical Laboratory has begun to publish a quarterly Technical Bulletin since January, 1966. The Committee strongly recommend that National Physical Laboratory should regularly and in time, bring out its Annual Report and circulated it amongst industry and other laboratories/institutions and universities who are interested in the subject.

They commend the new practice of observing on 'Open Day' as done in January, 1965, to acquaint the public and industry with the work done at the National Physical Laboratory. The Committee hope that this practice would be continued in future also.

REPLY OF THE GOVERNMENT

The recommendations of the Estimates Committee have been noted.

Action is being taken to print the annual report of the Laboratory and to circulate it to interested parties.

It is also proposed to observe an 'Open Day' early this year (1967).

[*CSIR U.O. No. 2/4/66-PU dated the 22nd February, 1967*].

Recommendation (Serial No. 61 Para 147)

The National Physical Laboratory has now a new Director and a shift has been effected to applied research programme oriented towards industry, defence, import substitution etc. The Laboratory now enters into the Fourth Plan period along with the rest of the country. The Committee expect that the National Physical Laboratory would be able to fulfil satisfactorily the research programme envisaged for it during the Fourth Plan period. The Committee hope that the NPL will be able to turn a new leaf in the near future, achieve concrete and quick results for the benefit of the industrial and economic development of the country and above all build up an esprit de corps and win for itself laurels of achievement in applied research.

REPLY OF THE GOVERNMENT

The observations of the Estimates Committee have been noted.

[*CSIR U.O. No. 2/4/66-PU dated the 22nd February, 1967*].

CHAPTER III

RECOMMENDATIONS WHICH THE COMMITTEE DO NOT DESIRE TO PURSUE IN VIEW OF GOVERNMENT'S REPLY

Recommendation (Serial No. 1 Para 7)

(i) *The Committee consider that there is need for critically reviewing the progress made so far in implementation of the Scientific Policy Resolution and to take follow up action to ensure that the progress is sustained in all the desired spheres. The Committee suggest that Government should arrange for a representative conference of scientists and educationists to review once every two years the progress made and to locate any deficiency and to suggest further measures to intensify the effort.*

(ii) *The Committee suggest that the conference should include not only representatives of Ministries of Education, Defence, CSIR, Universities, Planning Commission, as hitherto but also include representatives of University Grants Commission, Indian Institute of Technology, Department of Atomic Energy, Indian Council of Agricultural Research, State Research Institutes, leading industrial research institutes and industry, and would make for comprehensive review of the Scientific Policy Resolution. The Conference may divide itself into suitable working groups in order to devote greater attention to specific aspects of Scientific Policy Resolution. The Committee further suggest that working papers on different aspects of the Scientific Policy Resolution should be prepared and circulated well in advance to facilitate purposive discussion and to draw up recommendations.*

(iii) *The Committee suggest that in order to keep Parliament informed of the progress made in the implementation of the Scientific Policy Resolution, periodical review should be drawn up in the form of a Report which may be suitably presented to Parliament. Parliament should also be informed in precise terms of the follow-up action by presenting further Reports/laying statements in pursuance of the review.*

REPLY OF THE GOVERNMENT

The Ministry of Education has intimated that a representative conference of scientists and educationists was held during 18-19th July, 1958 to consider the implementation of the Scientific Policy Resolution. Another such conference was held during 4-5 August, 1963 to review the progress of the implementation of the Scientific Policy Resolution and to suggest measures for carrying further the objectives enunciated in the Resolution. Recommendations|Reports of these two conferences were made available to Parliament.

In July, 1964, the D.G.S.I.R., suggested that a third conference of scientists and educationists be held in February, 1965. In their Memo. No. 84|2|CF-63 dated the 28th November, 1963 the Cabinet Secretariat had issued instructions that whenever a conference to deal with general scientific organisational or policy matters was proposed to be held, the proposal should be brought to the notice of the Scientific Advisory Committee to the Cabinet. The suggestion of the DGSIR regarding a third conference of scientists and educationists to be held in February, 1965 was accordingly referred to the Scientific Advisory Committee to the Cabinet and Dr. H. J. Bhabha, Chairman of the Committee, wrote as follows:—

> "I think there is no useful purpose served by organising large conferences of the type. They merely take the time of a lot of our scientists, resulting in needless and avoidable expenditure and achieve very little. I am not therefore in favour of any such meeting being organised."

In deference to these views of the Scientific Advisory Committee to the Cabinet, the suggestion for a third Conference to be held in February, 1965 was dropped.

The recommendations made by the Estimates Committee in their 103rd Report were referred to the Cabinet Secretariat for obtaining views of the Scientific Advisory Committee to the Cabinet. In doing so, it was stated that two years seemed to be too short an interval for such conferences to be held and that these conferences should be held once in five years. The matter was considered by the Scientific Advisory Committee to the Cabinet at its meeting held on the 20th August, 1966 and *inter alia* the following decisions were taken at the meeting:—

(a) The S.A.C.C. should itself review the implementation of the Scientific Policy Resolution and should collect the necessary facts for this purpose.

(b) The S.A.C.C. should issue an annual report. This report would be submitted to the Cabinet. The possibility of making the report available to the public could also be considered.

(c) A conference of scientists and educationists, as recommended by the Estimates Committee, should be held some time in the winter of 1967-68.

The question of holding a conference during winter of 1967-68 is under consideration.

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February, 1967*]

COMMENTS OF THE COMMITTEE

The Committee however, reiterate that the Annual Report on implementation of Scientific Policy Revolution should be presented to Parliament.

Recommendation (Serial No. 6 Para 23)

It is well known that research is a slow process and takes time to produce results capable of being utilised. It is, therefore, very necessary that research programmes of the laboratories should be anticipated and spelt out in clear terms well in advance to enable the laboratories to produce results. The Committee consider that it would be advantageous if in the light of the industrial development envisaged over the next two Plan periods, an overall planning of research programme for the national laboratories and other research institutions is done as a part of the national policy well in advance so that the requisite know-how may be available to the industry at the appropriate time. The Committee feel that the lack of clear cut assignments, oriented to the requirement of the industry has been mainly responsible for tardy contribution made by the laboratories to the development of indigenous technology and know-how in the past.

They suggest that a committee consisting of Director-General, C.S.I.R. the representatives of the Planning Commission, Ministry of Industry and Directorate of Technical Development may be set up to identify the research problems to be undertaken by the research institutions on a long term basis, in the light of perspective plan for two Plan periods and review the same at suitable intervals.

REPLY OF THE GOVERNMENT

The basic idea of the Estimates Committee that there should be anticipation of national needs sufficiently in advance and closer link

with concerned planning and user departments is welcomed. Planning of research as a part of National Policy on development would be constructive and helpful. Some steps which have already been taken in this connection are as follows:—

The research programme of a National Laboratory/Institute is formulated on the advice of the Scientific Sub-Committees/Executive Councils keeping in view the developments taking place in the discipline and the requirements of the industry. These scientific sub-committees are assisted by panels of experts in their respective fields of research. Experts on the Panel are usually drawn from Industry, Directorate General of Technical Development, Universities including institutes of higher technology and scientists of the laboratory. The Panel of Experts help the national laboratory in drawing the programmes of various research divisions and the scientific sub-committee co-ordinates the working of the panels and sets out their recommendations in the form of a programme for the laboratory.

The National Laboratories/Institutes of the C.S.I.R. have increasingly oriented their research programmes on project basis with specific objectives and time targets. Considering the acute foreign exchange position and the need to make the country self sufficient, the laboratories have concentrated their research programmes on the following areas:

(i) Defence

(ii) Import substitution/elimination

(iii) Industrial technology.

(iv) Food and Agricultural products.

(v) Basic objective research.

Continuous contacts with the departments concerned with industrial development and planning namely, defence, railway, health etc. and food, are being maintained and the laboratories are fed with data of national requirements of industry in public and private sectors, inputs, outputs etc.

The C.S.I.R. has already set up a Committee for Scientific Research and Industry for cooperation with Directorate General of Technical Development and private industries.

A Conference of "Get-Together" of "Research and Industry" was organised by the C.S.I.R. in December, 1965 wherein more than 1000

persons from research organisations, industry and Government departments concerned with industrial and economic development participated. 237 high priority projects have been recommended by the Conference action for the implementation of which has already been initiated by the National Laboratories/Institutes on priority basis *vis-a-vis* the resources available. The projects yielding quick results will be given first priority. Copies of the recommendations of the "Get-Together" are available in the Library of the Parliament.

The Fourth Five Year Plan proposals of the C.S.I.R. were considered by the Governing Body of the C.S.I.R. at the meeting held in November, 1966 and it was decided that the Plan proposals of the C.S.I.R. should be scrutinized carefully *de novo* and items which might not have any immediate relevance to the country's needs may be deleted and that if any anticipatory or advance action had been initiated this should also be reviewed with the same end in view.

The Vice-President, C.S.I.R. has accordingly set up a Committee consisting of the following to assist the Director-General in this task:—

1.	D.G.S.I.R.:	Chairman
2.	Dr. S. Bhagavantam, Scientific Adviser to the Minister of Defence.	Member
3.	Dr. D. S. Kothari, Chairman, University Grants Commission.	Member
4.	Dr. T. S. Subramanian, Director of Research, Indian Jute Industries Research Association, Calcutta.	Member
5.	Shri Arvind N. Mafatlal, Bombay.	Member
6.	Dr. Triguna Sen, Vice-Chancellor, Banaras Hindu University, Varanasi.	Member
7.	Dr. K. A. Hamied, Director, CIPLA Laboratories, Bombay.	Member

8. Dr. T. R. Seshadri FRS, Emeritus Scientist, Delhi University, Delhi. — **Member**

9. Financial Adviser to CSIR. — Member.

The recommendation of the Estimates Committee would be brought to the notice of the Committee mentioned above.

The National Planning Council of the Planning Commission has also set up a Study Group for Scientific Research with eminent scientists as its members and necessary information about this is contained in para 12 of the Report.

The steps already taken are in keeping with the Estimates Committee recommedation. With a view to avoiding duplication of effort, the constitution of another Committee as recommended by the Estimates Committee will not, therefore, be necessary in the light of the position explained above in detail.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 20, Para 61)

The Committee find it difficult to appreciate how Government could have licensed the manufacture of 21 million pairs of arc carbons even though the total demand in the country is admittedly not more than 7 million pairs even at present. The Committee are surprised that the capacity of a company to manufacture arc carbons was doubled in March, 1963 from 3 million pairs to 6 million pairs, though the Ministry of Industry was informed that the National Physical Laboratory had developed the know-how for arc carbons by using indigenous materials and in spite of the fact that the company had not even achieved the production target of 3 million pairs of arc carbons.

The Committee are also unable to appreciate why there should be discrimination between this company and other manufacturers in the matter of import of raw materials and fixation of prices of arc carbons produced by them. They recommend that Government should fully investigate the matter and remove the anomalies, if any.

The Committee would also like Government to persuade the company to export arc carbons as soon as sufficient production capacity of other units is developed within the country with National

Physical Laboratory know-how to meet the internal requirements. It should not be too difficult for this company, which has international connections to export arc carbons in excess of 3 million pairs produced by them. This would leave scope for marketing of arc carbons with National Physical Laboratory know-how and would induce the Indian manufacturers to take it up in right earnest.

The Committee would further urge Government to ensure that the other parties which have been given licences for the manufacture of arc carbons and have not yet finalised their arrangements of technical know-how for its production, should be encouraged to take up the know-how developed by the National Physical Laboratory for the indigenous manufacture of arc carbons. The Committee hope that Government will not encourage any foreign collaboration in this particular field in future and would insist that National Physical Laboratory know-how should be utilised for the manufacture of arc carbons.

The Committee also regret the haste with which the National Research Development Corporation/Council of Scientific and Industrial Research/National Physical Laboratory had entered into an agreement with M/s. R. J. Wood & Co. for the development of arc carbons in 1959 when research work was still in progress. This resulted in arbitration proceedings with the firm which led to abnormal delay in the commercial exploitation of the process.

REPLY OF THE GOVERNMENT

The observations/recommendations of the Committee have been brought to the notice of the Ministries and organisations connected with the grant of licence to industry.

As regards fixation of price of arc carbons, a copy of letter No. 46 b.II/Price Control/1964/Carbons/2974 dated 18th May, 1966 from the Joint Chief Controller of Imports and Exports explaining how the prices are fixed is enclosed (Appendix I).

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February*, 1967]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please intimate the action taken by the Ministries and organisations connected with the grant of licences to industry.

REPLY OF THE GOVERNMENT

The Ministry of Industrial Development and Company Affairs have stated that the position on the recommendations 1 to 3 of the Estimates Committee contained in para 61 was adequately explained to the Estimates Committee at the time of the factual verification of the Report and has also been taken into account by the Committee as will be seen from the Report (Please see footnote at P. 63).

As regards recommendation 4 in para 61, the Ministry have stated that no new schemes with foreign collaboration are being approved where N.P.L. know-how is already available.

[*C.S.I.R. O.M. No. 2/4/66-PU dated 24th October*, 1967]

Recommendation (Serial No. 21, Para 63)

The Committee would like National Physical Laboratory to intensify its research on dry cell carbon rods so that the know-how can be framed out to Indian manufacturers at an early date.

REPLY OF THE GOVERNMENT

The process for the manufacture of dry cells is similar to the process for the manufacture of blocks and rods, which has been handed over to M/s Beni Ltd., 2-Factory Area, Patiala. The said firm has already been on this job and have since supplied a few samples for tests to M/s Estrela Batteries Ltd., Bombay. The National Physical Laboratory is keeping in touch with Messrs. Beni Limited so that further progress on this could be maintained. A scientist from the Laboratory has visited the factory of Messrs. Beni Limited at Patiala and advised the firm in this connection.

It is, therefore, felt that separate work on dry cell carbon rods need not be carried out at the Laboratory.

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 27, Para 72)

The Committee realise that the maintenance of basic standards of mass, length, time and temperature and the work of developmental

testing should not be undertaken—save in exceptional cases—such as development of the country and should be pursued vigorously. The Committee, however, note that these functions are at present spread over a number of divisions. They consider that it would make for economy and efficiency if the work relating to the maintenance of the standards and developmental testing is grouped together as far as feasible.

The Committee also consider that National Physical Laboratory should concentrate only on developmental testing and that routine testing should not be undertaken—save in exceptional cases—such as absence of specialised equipment for testing in other establishments in the country or where it is absolutely essential in the interest of developmental testing. The Committee need hardly point out that it is the function of the Indian Standards Institution to arrange for necessary testing facilities. Besides, Government have already established two Test Houses for undertaking this work.

The Committee would like, however, to emphasise that close co-ordination should continue to exist between the National Physical Laboratory, the Indian Standards Institution and the Testing Houses in the field of developmental testing and in undertaking research to design suitable instruments for testing work. The National Physical Laboratory should, in particular assist in adopting techniques and in designing instruments which would make for cheaper and quicker testing.

REPLY OF THE GOVERNMENT

The National Physical Laboratory does not, as a general rule, undertake routine testing, excepting in cases where facilities for such testing do not exist elsewhere. Close co-ordination exists between the laboratory and the Indian Standards Institution in as much as a good number of officers of the laboratory who are represented in the various committees of the ISI. Special tests are also carried out in the laboratory to enable the ISI to lay down standards for different articles to suit Indian conditions. In this connection, special techniques are also adopted and instruments designed which would make for cheaper and quicker testing.

The Director of the National Test House is a member of Panel of Consultants which ensures coordination between the NPL and the National Test House.

[C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February, 1967]

FURTHER INFORMATION CALLED FOR BY THE COMMITTEE

Please furnish specific reply in respect of para 1 of the recommendation.

REPLY OF THE GOVERNMENT

The matter was discussed by the Executive Council of the National Physical Laboratory, New Delhi at its meeting held on 26-8-66. The Director of the N.P.L. explained to the Executive Council that it would not be possible to group the work relating to the maintenance of Standards and developmental testing as this would entail duplication of staff and equipment. The Executive Council agreed with this view point.

Moreover, the disciplines for the maintenance of various standards are quite different and have little connection with each other.

In view of the above reasons, it is felt that the complete grouping is not feasible.

[*C.S.I.R. M.O. No. 2/4/66-PU dated 22nd February*, 1967]

Recommendation (Serial No. 34, Para 86)

The Committee are surprised that C.S.I.R. could not find a suitable scientist to hold the charge of the Electricity Division for the last twelve years. The Committee strongly recommend that the C.S.I.R. should urgently decide whether the work of the Electricity Division pertaining to only standards and testing justifies the strength of 16 scientific and technical and 4 class IV technical personnel. As the Director General himself has admitted that 'Electricity Division is basically a fundamental research division', the Committee would further recommend that C.S.I.R. should examine whether this work could not be carried on with greater advantage in the Power Research Institute, Bangalore or the Indian Institute of Science, Bangalore, or in some universities.

REPLY OF THE GOVERNMENT

The work of the Electricity Division at the N.P.L. pertains mainly to the setting up and maintenance of National electrical standards, calibration of electrical instruments, developmental testing of industrial products and giving technical aid to the industry. However, from time to time certain changes were made in the work of the Division like (i) magnetic testing and standards were passed on to

the Low Temperature Physics Division, (ii) Standards of radio and audio frequencies were first merged with the time Section of the Weights and Measures Division, but later on separated as an independent Time and Frequency Section under the Electronics Division, (iii) Storage batteries and electro-chemistry work were passed on to the Central Electro-Chemical Institute at Karaikudi and (iv) a separate section was set up to carry on work on X-rays. For historical reasons, however, the Division had at no time of its existence so far, the full quota of staff, space or equipment for all its requirements to cover the allotted field adequately. Since the work on standardisation and testing did not lead to the material advancement of the staff, there was a tendency on the part of the workers to migrate to other Divisions in the laboratory or other laboratories or research institutions, where better prospects of improvement appeared to present themselves. The Division has gradually shed most of the fundamental research work, and is now mainly concerned with work on standardisation and testing though a certain amount of applied research is still being done.

The existing staff of the Division is as follows:—

Scientist C	1
Scientist B	3
Sr. Scientific Assistant	1
Sr. Scientific Assistant (Mech.)	1
Sr. Technical Assistant	1
Junior Mechanical Assistant	2
Sr. Laboratory Assistant	1
Sr. Electrician	2
Mistry	1

It is not correct to say that the Division was without a Scientist in Charge to guide its research activities for the last 12 years. Ever since the retirement of the Assistant Director of the Division twelve years ago, the Division has been headed by a Scientist C, Scale of pay: (Rs. 700—50—1250) who is at present being paid a special allowance of 20 per cent for looking after the work of the Division. He holds a degree of Master of Science in Physics and an Electrical Engineer (I Class Honours) Degree from the London University, and has received special training at the National Physical Laboratory, Teddington, in the maintenance of Electrical Standards and Electrical Measurements and has considerable practical experience in the field.

The statement below gives the number of test reports issued during the past 10 years, and the revenue earned:

Year	No. of reports	Testing fees Rs.
1956-57	51	2,300
1957-58	77	3,700
1958-59	126	4,100
1959-60	165	6,760
1960-61	124	6,008
1961-62	103	4,849
1962-63	112	6,602
1963-64	110	5,738
1964-65	121	4,320
1965-66	220	10,772

The work could have been much more but for the indecision during the years 1961-64 about the policy on testing and also due to lack of space and personnel. What is actually needed is to enlarge the scope of testing facilities and standardisation work to meet the increasing demands of the electrical industry in the country, and for this purpose to further strengthen the staff. There is no other organisation in India which caters to this type of work. Even if a limited quantity of testing is carried out elsewhere, this cannot be considered a substantial duplication, but may even be considered necessary in the interest of industrial development. Moreover, being pioneers in the line, and having all facilities for standardising, calibrating and testing all types of electrical equipment, it is felt that it would not be advantageous, nor practical, to transfer this work to any other organisation. Incidentally, this work falls within the scope and functions of the objectives with which this Division was set up in the laboratory.

[*CSIR UO No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 35, Para 87)

The Committee regret that research on 'Insulating Materials' which is one of the main functions of the Power Research Institute, Bangalore, has been undertaken in the National Physical Laboratory without ascertaining the research work done at the former Institute.

In view of the limited resources available in the country for research, the Committee cannot too strongly stress the need for avoiding such infructuous duplication of work. They feel that before long term research on any project is undertaken, the national laboratory/CSIR should make sure identical research work is not being done by other institutions. Where it is absolutely essential in national interest to undertake research in more than one institution, there should be full coordination and exchange of information to help speed up research and avoid infructuous duplication.

REPLY OF THE GOVERNMENT

In accordance with its objectives, the NPL has been undertaking tests on electrical machines, appliances, devices and materials since 1951, and has been testing insulating materials both as used in such electrical devices and as materials separately even before the PRI came into existence. The NPL is, therefore, well equipped to carry out many types of tests on insulating materials in addition to carrying out precision capacitance measurements and research work in dielectrics. The subject of insulating materials also lies within the scope of the work of the NPL according to the Plan.

The PRI, Bangalore, was set up with the help of UN Special Fund —foreign exchange worth Rs. 91 lakhs plus foreign expert, plus training facilities for Indian Engineers abroad—starting in 1960, and the Insulating Materials Laboratory is one of its seven Divisions. A copy of the letter received from the PRI regarding the work carried on there is enclosed for reference*. It will be noted that the PRI is not concerned with the testing of electrical appliances, machines, etc. according to standard specifications, but with the testing of insulating materials as such. The testing of electrical appliances, however, requires the testing of the insulating materials also *inter se*, and it was, therefore, incumbent on the NPL to equip itself for testing electrical devices and materials, including testing insulating materials and insulating properties of electrical devices. Facilities to test insulating materials have, therefore, existed in the NPL. While the NPL looks at it more from the angle of electrical appliances, the PRI would, if they were to take up such a project, look at it from the materials angle only.

The subject of the point under consideration, *i.e.* survey and investigation of dielectrical and insulating materials, may appear to be an overlaping one between the scope of the two organisation, but actually it is not so. The nature and scope of the work of the two organisations are quite different. The Scientist-in-Charge of the

*Not printed.

Division is a member of the ISI Committee on Insulating Materials, of which the Director of the PRI is Chairman. The ISI and "aid to industrial work" requires that there should be several laboratories in India equipped to undertake the testing of electrical devices and materials, including testing of insulating materials and testing insulating properties of electrical devices. The NPL would, therefore, like to continue the project.

[*CSIR UO No. 2/4/66 PU dated 22nd February, 1967*].

COMMENTS OF THE COMMITTEE

The Committee, however, hope that the question of avoiding infructous duplication between NPL and other institutions, set up later on for research in individual disciplines will be gone into by Government in due course.

Recommendation (Serial No. 36, Para 97)

While the Committee are happy to note that the achievements of the Radio Propagation Unit have been praised by Prof. Blackett in 1963 the Third reviewing Committee of C.S.I.R. (1964) and other scientists, they are unable to appreciate why this Unit is being continued as a part of the National Physical Laboratory.

It has been admitted that the work of this Unit has no direct relation to the objectives of the National Physical Laboratory but pertains more to the fields of Ionospheric and upper atmosphere studies which are dealt with by specialist organisations, like the Physical Research Institute, Ahmedabad and the Indian Space Research Committee. The Committee recommend that in the interest of proper development of the work on this important subject the question of transferring/associating the unit with Physical Research Institute, Ahmedabad and/or the Indian Space Research Committee may be examined early.

REPLY OF THE GOVERNMENT

The Executive Council of National Physical Laboratory at its meeting held on 26-8-1966 decided after careful consideration, that the Radio Propagation Unit, renamed as 'Radio Science' should continue to function in the NPL itself until such time it was possible to transfer the whole unit to some other organisation.

[*CSIR UO No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 38 Para 105)

The Committee suggest that C.S.I.R. should taken an early date decision regarding the transfer of work of the Applied Mechanics Division to the Central Mechanical Engineering Research Institute, as suggested by Prof. Blackett as far back 1963.

REPLY OF THE GOVERNMENT

The full text of Prof. Blackett's recommendation on Applied Mechanics Division of the N.P.L. is reproduced below:—

> "The mechanical testing seemed to me good, but on too small a scale if this Division is to play a decisive role in Indian industry. Some of the more routine testing might go to the new standards and testing division, and the rest might either remain as it is, or be expanded, or be transferred to the new Central Mechanical Engineering Research Institute, Durgapur. The basic work here on single metallic crystals is an example of a potentially interesting research which could not possibly be adequately directed by a Director who is also concerned with testing motor bicycles, crash helmets and general mechanical structures; so this pure work should go to the basic physics group and so under University control.
>
> I was not able to judge whether the work on photoelasticity and structural analysis was mainly directed to solving specific design problems for outside users or was intended to be basic in character and so of little value. A mechanical engineer, *e.g.*, Professor Moore from the Delhi College of Engineering and Technology might be asked to look into this. It is clear that this Division gives a lot of valuable help to industry. This should be continued and encouraged. The work on non-destructive testing by X-ray and magnetic methods well be expanded."

Based on the recommendation of Prof. Blackett, a Standards Division constituting the Divisions of Weights and Measures, Electricity, Head & Power and Applied Mechanics, was formed. The Executive Council, however, later on decided that the *status quo* should be maintained and consequently the Standards Division was abolished and the Applied Mechanics Division along with the other three Divisions was restored to its original status. The Division has accordingly continued to do the work that it was doing before the issue of the Blackett Report.

The Third Reviewing Committee, while discussing the work of the National Physical Laboratory, *inter alia* recommended that the applied work should be developed around the present Divisions of the Laboratory and that the Applied Mechanics Division should be "revived" with its work re-oriented to give support to standards and testing.

It will thus be apparent that neither Professor Blackett nor the Reviewing Committee has categorically suggested the transfer of the Division to any other place. In view of the decision of the Executive Council that the four Divisions referred to above should remain as they were, the question of transferring any work to the Standards Division did not arise. The Third Reviewing Committee has gone still further and recommended that the Division should be expanded.

The Estimates Committee has recommended that the work of the NPL should be reoriented towards defence, import substitution and export promotion, and that the laboratory should in particular assist in adopting techniques and in designing instruments which would make for cheaper and quicker testing. The whole work of the Applied Mechanics Division is actually geared to fulfil these objectives. The projects taken up aim at developing the know-how for some of the urgently required imported equipment. Its testing facilities render useful service to the local small scale industry which, because of inadequate resources and the time involved, cannot possibly refer its problems to the Central Mechanical Engineering Research Institute. The Division advises indigenous manufacturers, and calibrates their machines at site. The production of these industrial machines saves foreign exchange. In pursuance of these objectives, the Division now has the following projects allotted to it—

1. Fabrication and calibration of strain metres.
2. Photoelastic strain gauges.
3. Application of moire fringes to stress analysis.
4. Design of ruling engine for making moire fringe grids.
5. Fabrication of photoelastic bench.
6. Fabrication of 3,000 kg. dead load testing machine and abrasion testing machine.

All these projects are industry oriented. Project No. (6) has been undertaken in hand to set up a standard of force, which is one of the primary responsibilities of the NPL. The Division also has a programme of hydrostatic extrusion of metals. This is a part of a

bigger programme in the laboratory on the production and utilisation of high pressures and will considerably help the new Division of Materials in the working of refractory metals. While drawing up the programme of the Division, care has been taken to see that there is no duplication of work with that carried on at the Central Mechanical Engineering Research Institute.

In this connection it is stated that this Division stands second in the list of revenue earning Divisions. The statement below gives the number of reports issued and the revenue earned from the year 1956-57 onwards.

Year	No. of test reports issued.	Testing fees earned
		Rs.
1956-57	98	4,300
1957-58	349	12,000
1958-59	426	11,600
1959-60	266	7,209
1960-61	218	6,201
1961-62	520	6,206
1962-63	158	5,680
1963-64	200	9,148
1964-65	254	13,211
1965-66	327	18,100

The Executive Council of the NPL at its meeting held on 26th August, 1966 considered this question in detail and relevant extract from the proceedings of the meeting is given below:—

> "The Executive Council approved that the Division of Applied Mechanics (re-designated as Division of Mechanics) should continue to function in the National Physical Laboratory in view of the fact that the Division is directly concerned with the setting up of the standards of force, which is one of the primary responsibilities of the Laboratory. The Director, National Physical Laboratory, *inter-alia* informed the Executive Council that the Division of Applied Mechanics has designed and fabricated a three ton-prototype dead weight testing machine and that this type of

activity does not fall within the purview of the CMERI, Durgapur."

In view of the facts explained above, and also of the fact that the Division is doing very useful work, it was considered advisable to retain in the N.P.L.

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 42 Para 112)

The Committee are in agreement with the recommendations made by Prof. Blackett and the Sub-Committee of the National Physical Laboratory that Glass Technology Section should be constituted into an independent manufacturing unit managed on commercial lines. They would like the Council of Scientific and Industrial Research to take early action in the matter.

REPLY OF THE GOVERNMENT

The Executive Council, National Physical Laboratory at its meeting held on 26th August, 1966 decided that steps may be taken to constitute the Glass Technology Unit into a semi-commercial manufacturing unit in accordance with their earlier decision of 1st October, 1964. It was also decided that the proposed manufacturing Unit should be under the administrative control of the Director, NPL.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

COMMENTS OF THE COMMITTEE

The Committee, however, hope that the Glass Technology Section should be constituted into an independent manufacturing unit managed on Commercial lines, as early as possible.

Recommendation (Serial No. 55 Para 138)

The Committee are concerned to note that the Scientific Advisory Committee for the National Physical Laboratory has not been appointed so far although it has been specifically provided for in the Rules. It is surprising that neither any amendment to the Rules has been made by the C.S.I.R. nor has any exemption been sought from the provisions thereof. Apart from the question of compliance with the rules, which is statutory obligation, the Committee do not agree that the Scientific Sub-Committee which has been appointed by the

Executive-Council since 1963, can be a proper substitute for the Scientific Advisory Committee which is to be composed of scientists actually engaged in the particular subject, leading industrialists and representatives of the concerned Ministries of the Government of India. The Committee regret to observe that the CSIR has not been able to ensure that the provisions made in the Rules and Regulations are being observed by the Laboratory in actual practice. The Committee recommend that immediate action be taken to appoint Scientific Advisory Committee for the National Physical Laboratory as provided for in the Rules and also for other Laboratories where it has not been formed so far.

REPLY OF THE GOVERNMENT

Kind attention of the Estimates Committee is invited to the reply given to recommendation at Serial No. 30 in Appendix V, para 63 of their 104th Report on CEERI, Pilani (Copy enclosed for ready reference).*

[*C.S.I.R. U.O. No. 2/4/66-PU dated 22nd February, 1967*]

Recommendation (Serial No. 59 Para 142)

The Committee are unhappy to note that a large number of research fellows left the National Physical Laboratory without completing their assinged work. The Committee would like the C.S.I.R. to investigate the causes for this phenomenon in this and other laboratories and take suitable remedial measures.

It appears that all was not well in the N.P.L. with the result that quite a large number of scientists and research fellows have left the Laboratory. They hope that the CSIR will make a proper study into the causes of so many desertions.

REPLY OF THE GOVERNMENT

The Council of Scientific and Industrial Research introduced in 1958 a scheme of Senior and Junior Research Fellowships to be awarded to young scientists working for Doctoral Degrees or post-doctoral distinctions in various fields of science, engineering and technology and for research work under competent senior scientists in the National Laboratories/Institutes of the CSIR, Universities and other research organisations.

*Not Printed.

The terms and conditions of fellowships, as embodied in the booklet entitled "Terms and Conditions for CSIR Fellowships and Research Grants", were originally framed by a Committee consisting of Shri Kasturbhai Lalbhai, Lala Shri Ram, Dr. J. C. Ghosh, D.S.I.R., and the Financial Adviser to C.S.I.R. These were subsequently approved by the President of CSIR (late Shri Jawahar Lal Nehru) and the Governing Body.

The basic idea behind the scheme of research fellowships is to attract bright young people with good academic or research background who are considered fit for a research career and to afford to them an opportunity for doing research work before they could find a suitable job for themselves on the basis of their research experience.

The scheme does not provide any guarantee to a research fellow for a regular appointment for obvious reasons. The Council do not, therefore, come in the way of Research Fellows applying for foreign scholarships/training or for regular jobs during the tenure of their fellowships. Since, as explained above, the main purpose of the scheme is to attract young scientists for a research career and training in different disciplines of scientific, engineering and technology, any condition in the rules involving liability to refund the fellowship amounts, or other penalties, before completion of their fellowships would undoubtedly dissuade first class scientists from applying for fellowhips thereby defeating the very object of this scheme. Moreover, a mere inclusion of a penal clause would not straight away enable the CSIR to recover moneys from the fellows either since unnecessary litigation and paper work would result in trying to get the moneys out of the fellows, and in most cases the efforts may eventually prove infructuous. On the other hand, any penal clause will, in the ultimate analysis, undoubtedly damage the cause of science, the cumulative financial effect of which is likely to be much more than the paltry recoveries which we might be able to obtain in a few cases through penal clauses.

The tenure of a research fellowship is for two years with a provision for extension by one more year. If a fellow wishes to leave the fellowship before the expiry of his/her tenure he|she may do so with the prior approval of the Council of Scientific and Industrial Research indicating specific reasons for not continuing the fellowship.

The research fellows attached to the National Laboratories/Institutes do their work under the guidance and supervision of an investigator/a senior scientist in the laboratory and the present set

up ensures that the research work of a laboratory is not materially affected by a Fellow relinquishing the fellowship prematurely.

On a review, it has been clear that most of the research fellows left the NPL not because they were dissatisfied with the state of affairs in the laboratory but because of more attractive alternatives, like getting regular jobs elsewhere, or securing Fellowships for higher studies abroad.

Regarding scientists, the position has been explained separately in reply to recommendation at Serial No. 58 in Appendix XII contained in para 141 of the Report.

[*CSIR U.O. No. 2/4/66-PU dated 22nd February, 1967*]

NEW DELHI-1.
February 12, 1968.
Magha 23, 1889 (*Saka*).

P. VENKATASUBBAIAH,
Chairman,
Estimates Committee.

APPENDIX I

Copy of Letter No. 46.b/II/Price Control/1964/Carbons/2974 dated the 18-5-66 from Ministry of Commerce Office of the Joint Chief Controller of Imports & Exports, New Marine Line, Churchgate, to Shri C. Balasubramaniam, Deputy Secretary, New Delhi.

SUBJECT:—*Fixation of prices of imported and indigenous Cinema Arc Carbons.*

Please refer to your U.O. No. 14(47)/62-LEEI dated 10.5.1966 on the subject noted above.

The prices of Cinema Carbons imported through Established Importers and the State Trading Corporation have been fixed by allowing on the landed cost a profit margin not exceeding 15 per cent on 6x7 size Carbons and 20 per cent on other sizes. This is in accordance with a decision contained in para 6 of the Minutes of the Meeting of Cinema Carbons Advisory Committee held on 9-12-1960, an extract of which is given below.

As regards the fixation of prices of the indigenously manufactured Carbons, the same decision regarding the margin of profit applies. In order to determine the manufacturing cost, the manufacturer is required to furnish us the details of cost/expenditure leading to the finished product. This statistical data cover all such items of expenditure as cost of raw materials, labour and technical know-how, investment and interest thereon, packaging and casing, rates, rents and taxes etc. There is, however, no bar to the manufacturer selling his product at a lower margin of profit to commercialise his product extensively.

An extract taken from para 6 of the Minutes of the Meeting of Cinema Carbons Adv. Cte. held in the office of the Jt. Chief Controller of Imports and Export on 9-12-1960.

6. *Price and profit margin*:

The Chairman called for the views of the members present on this subject. Shri Fatehali informed that, prior to this meeting, the representatives of dealers and the Exhibitors' Association had met and that they had already come with certain proposals in this regard. He requested Shri K. M. Modi, President of the Bombay Exhibitors Association, to give the details. Shri Modi said that the following proposals were agreed to by the representative of the dealers as well as the Exhibitors' Association:—

1. The margin of profit on Cinema Carbons of 6X7 sizes should not exceed 15 per cent on the landed cost.
2. The margin of profit on cinema carbons of all other sizes should not exceed 20 per cent on the landed cost.
3. The packing charges for 100 pairs on H.I. Carbons should not exceed Rs. 2.50 nP.
4. The packing charges for 100 pairs on L.I. Carbons should not exceed Rs. 1.50 nP.
5. The above prices were excluding sales tax.
6. The margin of profit proposed above will not apply to carbons which are sold at a lower margin of profit at present. In such cases, the lower margin of profit will remain in force.

APPENDIX II

List of members of the Committee of Experts for the development of Computer technology in India

1. Dr. S. Husain Zaheer, D.G.S.I.R.—*Chairman*
2. Dr. Amarjit Singh, Director, CEERI, Pilani.
3. Prof. S. K. Mitra, Head Computer, Development & Research Division, Indian Statistical Institute, Calcutta.
4. Dr. H. K. Kesavan, I.I.T., Kanpur.
5. Prof. G. S. Ramaswamy, Director, SERC, Roorkee.
6. Prof. R. Narasimhan, Tata Instt. of Fundamental Research, Bombay.
7. Dr. W. D. Hopper, Rockfeller Foundation, New Delhi.
8. Dr. J. S. Chatterjee, Jadavpur University, Calcutta.
9. Dr. S. Krishnan, Scientist, N.A.L., Bangalore.
10. Shri O. P. Mohla, A.F.A. to C.S.I.R., New Delhi.
11. Shri K. G. Krishnamurthi, Secretary, C.S.I.R., New Delhi.

APPENDIX III

(*Vide* Introduction)

Analysis of the Action taken by Government on the recommendations contained in the 103rd Report of the Estimates Committee

(*Third Lok Sabha*)

I.	Total number of recommendations made .	61
II.	Recommendations that have been accepted by Government *vide* recommendations at S. Nos. 2 to 5, 7 to 19, 22 to 26, 28 to 33, 37, 39 to 41, 43 to 54, 56 to 58, 60 and 61 referred to in Chapter II)	
	(i) Number	49
	(ii) Percentage to total .	80·3%
III.	Recommendations which the Committee do not desire to pursue in view of Government's reply (*vide* recommendations at S. Nos. 1, 6, 20, 21, 27, 34 to 36, 38, 42, 55, and 59, referred to in Chapter III)	
	(i) Number . .	12
	(ii) Percentage to total	19·7%