P.A.C. No. 280

PUBLIC ACCOUNTS COMMITTEE (1969-70)

(FOURTH LOK SABHA)

HUNDRED AND TWENTY-SECOND REPORT

[Audit Report (Civil), 1969 and Audit Reports on the Accounts of the Council of Scientific and Industrial Research 1965-66 and 1966-67]

LOK SABHA SECRETARIAT
NEW DELHI

April, 1970/Chaitra, 1892 (S)
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Cont-ents (i)	Foot Note	1	Note	Not
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*Ceased to be a Member of the Committee w.e.f. 3rd April, 1970.

INTRODUCTION

I, the Chairman of the Public Accounts Committee, as authorised by the Committee do present on their behalf this Hundred and Twenty Second Report of the Public Accounts Committee (Fourth Lok Sabha) on Audit Report (Civil) 1969 and Audit Reports on the Accounts of the Council of Scientific and Industrial Research 1965-66 and 1966-67.

2. Audit Report (Civil) 1969 was laid on the Table of the House on 18th April, 1969. Audit Reports on the Accounts of the Council of Scientific and Industrial Research for 1965-66 and 1966-67 were laid on the Table of the House on 10th August, 1967 and 24th April, 1970. The Committee examined paragraphs relating to the Council of Scientific and Industrial Research at their sittings held on 3rd, 4th and 6th November, 1969. The Committee considered and finalised the Report at their sitting held on 29th April, 1970. The Minutes of these sittings form Part II* of the Report.

3. A statement showing the summary of the main conclusions/recommendations of the Committee is appended to this Report. For facility of reference these have been printed in thick type in the body of the Report.

4. The Committee place on record their appreciation of the assistance rendered to them in the examination of these accounts by the Comptroller and Auditor General of India.

5. The Committee would also like to express their thanks to the officers of the Ministry of Education and Youth Services (Council of Scientific and Industrial Research) for the cooperation extended by them in giving information to the Committee during the course of their evidence.

NEW DELHI;
April 29, 1970
Vaisakha 9, 1892 (*Saka*)

ATAL BIHARI VAJPAYEE,
Chairman,
Public Accounts Committee.

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I

EXPENDITURE ON PAY AND ALLOWANCES OF THE STAFF AND CONTINGENCIES.

The expenditure on pay and allowances of staff and contingencies of the Council's headquarters office and various laboratories has been increasing over the years. In the laboratories, the expenditure increased from Rs. 398.17 lakhs in 1963-64 to Rs. 741.46 lakhs in 1967-68. In the Council's headquarters office it rose from Rs. 28.71 lakhs in 1963-64 to Rs. 47.26 lakhs in 1967-68.

1.2. In July 1967, an expert Committee appointed to consider the 4th Five Year Plan proposal of the CSIR made the following observations:—

(a) There has been disproportionate increase in expenditure on account of salaries as compared to working expenses in most of the established national laboratories/institutes. This trend is not conducive to efficient functioning and would have to be corrected by carefully checking the growth of unrelated staff and diverting a higher proportion of the resources on actual research work.

(b) There had been considerable growth in non-research activities of the C.S.I.R. consuming a sizeable proportion of available resources. As the main objective of the C.S.I.R. is promotion of application-oriented research, other activities should not be allowed to grow at the expense of this primary function.

(c) There was considerable imbalance in the staffing pattern in most of the laboratories, resulting in an unduly high proportion of non-research staff.

1.3. The Committee desired to be furnished with a statement showing the data about staff employed and expenditure thereon on headquarters office and the national laboratories under scientific staff, administrative staff, class IV staff etc. during the last five years. The CSIR have furnished

the requisite information in respect of 30 laboratories. The data is summarised below:—

Year	Scientific	Auxiliary	Administrative	Class IV	Total	Percentage of 5 to 6
1	2	3	4	5	6	7
1 64-65 . .	2,475	3,164	1,490	3,263	10,392	31·7%
1965-66 . .	2,970	3,724	1,734	3,872	12,300	31·7%
1966-67 . .	3,162	4,000	1,752	3,963	12,877	31%
1967-68 . .	3,228	3,978	1,752	3,996	12,954	30·7%
1968-69 . .	3,360	4,202	1,837	4,067	13,466	30·4%

1.4. Data on the lines above is still awaited from the following institutions:—

(i) Indian Institute of Experimental Medicines

(ii) Central Mechanical Research Institute

(iii) Regional Research Laboratory, Jorhat

(iv) Central Indian Medicinal Plants Organisation.

1.5. Detailed instructions were issued by the CSIR in December, 1967 containing the following guidelines to correct gradually the imbalances wherever they exist between scientific, technical and administrative staff:—

(i) The ratio of research staff: supporting technical staff: administrative staff should be kept at 1:2:1 (including the strength of Class IV staff) and the imbalances where they exist, between scientific, technical and administrative staff should be corrected gradually.

(ii) In filling up posts falling vacant on account of resignation, retirement, promotion and transfers, if Directors like to convert any such vacant post to some other type of post or keep it in abeyance or abolish it, they may kindly obtain the approval of the Executive Council.

(iii) Research scale should not be given to anyone not actually engaged in research.

(iv) Scientific and technical qualifications should be laid down for all posts carrying scientific and technical designations and such posts should not be utilised for handling office work.

(v) Advertisements should be such as to give the widest possible choice and should not be restrictive.

(vi) Expenditure on salaries and allowances of administrative personnel should not exceed certain percentage of the total expenditure on this account (computation will include personnel in the House-keeping and Accounts Sections, typists and stenographers, stores and purchase, reception and telephone exchange and others and routine clarical duties). Since the administrative expenditure on salaries in the case of your laboratory/Institute exceeds 20% of the salary budget, this may kindly be brought down gradually to 20% and less.

1.6. The Governing Body of the Council observed in 1967 that the proportion of class IV staff in the National laboratories was abnormally high and that steps should be taken to train as many of these as possible in various trades, so that they may be useful members of research laboratories. Necessary instructions were issued to the National Laboratories in November, 1967 to encourage class IV staff to improve their educational standards and technical skills by taking up study and straining in vocational schools and establishment after office hours and without detriment to their normal duties in laboratories/Institutes. When they acquire the necessary educational qualifications and training in technical skills they may be considered for employment in technical skilled jobs in laboratories/ institutes and considered for promotion to higher auxiliary technical posts in their respective lines, if and when opportunities occur, provided they satisfy the qualifications and experience laid down for the posts. The Committee have been given the following information regarding the Number of Class IV employees who have been trained in different trades as reported by certain laboratories/institutes :—

"Number of Class IV staff trained in Trades.

Name of Laboratory/Institute	*1967*	*1968*	*1969*
	No.	No.	No.
1. Central Leather Research Institute, Madras	1	2	5
2. Central Electronics Engg. Research Institute, Pilani	2	3	1
3. Indian National Scientific Documentation Centre, New Delhi	7	..	13
4. Central Electro-Chemical Research Institute, Karaikudi	..	6	10
5. Central Glass & Ceramic Research Institute, Calcutta	..	7	11
6. National Metallurgical Laboratory, Jamshedpur	..	2	..
7. Central Food Technological Reserach Institute, Mysore	..	3	..
8. National Physical Laboratory, New Delhi		48	
9. Central Salt & Marine Chemicals Research Institute Bhavnagar		13	

Name of Laboratory/Institute	1967	1968	1969
	No.	No.	No.
10. Central Mining Research Station, Dhanbad .	2	2	1
11. Central Road Research Institute, New Delhi .	..	..	3
12. Indian Institute of Petroleum, Dehra Dun .	3	1	8

1.7. The Director General, CSIR, stated during evidence, "The recruitment of Class IV staff has become very much restricted. I do not think it is desirable to give them notice."

1.8. The Committee of Enquiry made the following observations in regard to the staff position in CSIR:

"The classification of the posts in the CSIR, as given in Bye-law 57, is quoted below:

'The officers and staff of the Society shall be grouped in following categories:

(i) those engaged in research work;

(ii) those engaged in scientific work other than research work;

(iii) auxiliary technical;

(iv) administrative, ministerial and accounts;

(v) subordinate staff (Class IV)'."

"The Committee noticed that quite often persons have been given scientific designations in divisions concerned with purchase, stores, publicity, publications library, information, extension services, manpower, pilot plant work, etc., when, from an analysis of their work and record, it would appear that they are clearly performing administrative/technical tasks."

"The study of the 245 cases has impressed upon the Committee the need to reclassify all the posts under the CSIR. The Committee have noted that the technical posts in the CSIR carry some advantages which are not attached to the administrative posts; and the scientific posts enjoy certain advantages which are not available to the incumbents of the technical and administrative posts. The overall impression of the Committee is that the administrative posts have been given scientific/technical designations partly because the latter carry comparatively higher salaries and partly because creation of administrative posts, according to the prevailing practice in the CSIR, require the concurrence of the Financial Adviser which is not necessary for scientific posts. Similarly, while the provision to confer certain special benefits (e.g. higher rate of increments,

shorter time scales, merit promotion and the higher age of retirement, etc.) were apparently intended for scientists engaged in research, the CSIR by classifying the posts held by them as scientific, extended these benefits to a large section of their employees who were not engaged in research work. If the Committee are right in their interpretation of the intention behind the provisions giving higher benefits to certain officers, they consider it essential that a distinction must be clearly drawn between the posts which can be described scientific, technical or administrative."

"The Committee have observed several cases where posts were created without due scrutiny. On some occasions posts were created to provide higher pay to the existing incumbents. For instance, a post of Deputy Director was created in the National Register Unit at the Headquarters to give higher scale of pay to Shri ..... "In the National Botanic Gardens, Lucknow a post of Senior Scientific Officer (Grade I) was filled up in 1966 for the development of Musabagh Garden although the land for the project has not been transferred to the National Botanic Gardens by the Government of Uttar Pradesh till to-day. In certain other cases posts were transferred from one Laboratory to the other or from the Laboratories to the Headquarters which in the Committee's opinion amount to creation of posts." Instances of such transfers have been quoted in paragraphs 10.12 and 10.15 of the Report."

"The Committee recommend that proposals for creating new posts should be more rigorously scrutinised by the Executive Council so as to avoid excessive expenditure on salaries and allowances. They also recommend that the transfer of posts should be stopped."

"The Committee recommend that the CSIR should reclassify all the existing posts according to the criterial given above and ensure its implementation. For the purpose, the Governing Body of the CSIR should appoint a broad-based Committee which must include, besides the Director-General and a few Directors of the CSIR, high officials from other research organisations in the country, such as, the Indian Council of Agricultural Research, the Indian Council of Medical Research, the Defence Research and Development Organisation, the Department of Atomic Energy etc."

1.9. The Committee are perturbed over the increase in the establishment expenditure of C.S.I.R. Over the period 1963-64 to 1967-68, the expenditure on this account (including contingent expenditure) increased from Rs. 3.98 crores to Rs. 7.41 crores. The increase was particularly marked at the headquarters office where the expenditure jumped from Rs. 28.71 lakhs to Rs. 47.26 lakhs during this period. These figures leave little room for doubt that there has been a proliferation of non-research activities in the organisation. An Expert Committee which was set up to review the Fourth Plan programmes of the C.S.I.R. drew pointed

attention to this phenomenon when they observed that "the considerable growth in non-research activities of the CSIR" is "consuming a sizeable proportion of the available resources."

1.10. How greatly the non-research staff outnumber the research staff in the organisation would be clear from the figures furnished to the Committee. 30 out of 34 establishments run by C.S.I.R. (in respect of which data has been provided to the Committee) had a total staff of 13,466 in 1968-69. Of this, scientific staff accounted for 3360, or about 25 per cent of the total staff, the balance being accounted for by auxiliary, administrative and class IV staff. The last category of staff alone accounted for about 30 per cent of the total number.

1.11. In the absence of a definite distinction in the organisation between scientific, technical and administrative posts, it is clear that the proportion of scientific staff actually employed is even less than that disclosed by the foregoing analysis. The Committee of Enquiry have pointed out that in C.S.I.R. "quite often persons have been given scientific designations in divisions concerned with purchase, stores, publicity, publications, library, information etc., when, from an analysis of their work and record, it would appear that they are clearly performing administrative/technical tasks." That Committee observed that this had been done because scientific posts "carry comparatively higher salaries and.....because creation of administrative posts requires the concurrence of the Financial Adviser which is not necessary for scientific posts." It is obvious that if the posts are "classified strictly on a functional basis", as suggested by that Committee, it would be found that the organisation carries a larger number of non-research staff than available figures suggest.

1.12. The Committee are left with the impression that neither the C.S.I.R. nor the laboratories have made any sustained efforts to control the expenditure on establishment. The Committee of Enquiry drew attention to "several cases where posts were created without due scrutiny" and also to the fact that "on some occasions posts were created to provide higher pay to existing incumbents." This, coupled with the tendency to classify non-research staff as scientific staff thereby extending to them "certain special benefits apparently intended for scientists engaged in research" has tended to push up the establishment expenditure of the organisation.

1.13. The C.S.I.R. is an Institution meant for conducting application-oriented research. It is, therefore, essential for the organisation to ensure, as pointed out by the Expert Committee, on Fourth Plan, that "other activities should not be allowed to grow at the expense of this primary func-

tion." To achieve this, the Committee would suggest action on the following lines.

(i) There should be a reclassification of the posts in the organisation by "a broad-based Committee", as suggested by the Committee of Enquiry, so that only persons actually engaged on research constitute the scientific staff.

(ii) Strict financial discipline should be observed in the creation of new posts and some guidelines provided to the laboratories as to the proportion of scientific staff to the rest of the staff. The C.S.I.R. have formulated some norms in this regard—1 research worker for 3 supporting technical and administrative staff—but it should be examined whether this could be tightened up further.

(iii) The proportion of class IV staff is quite obviously high. Further recruitment in this category should be stopped and the scope for absorbing this staff, by suitable vocational training, examined. The Committee note that a start in this regard has been made.

Unnecessary expenditure

Audit Paragraph

1.14. In 1965 the third reviewing committee of the Council recommended that in order to secure effective coordination between industry and the national laboratories the four units at the Council's headquarters (viz., Research, Survey and Planning unit, Central Design and Engineering unit, Scientific and Technical Manpower unit and Industrial Liaison and Extension Office) should be strengthened. These units, however, were converted into independent directorates with their own executive councils and their staff was increased by 18 to 933 per cent. In November 1967, however, the Governing Body of the Council felt that the creation of independent directorates was unnecessary and contrary to the intention of the reviewing committee. These directorates were, therefore, abolished from March 1968 and the units merged with the headquarters office.

1.15. As compared to the expenditure during 1965-66 the additional expenditure during 1966-67 and 1967-68 was Rs. 5.06 lakhs and Rs. 2.60 lakhs respectively. A substantial portion of the additional expenditure of Rs. 7.66 lakhs was thus due to incorrect implementation of the recommendations of the reviewing committee.

[Paragraph 119 of Audit Report (Civil), 1969].

1.16. The Committee desired to be furnished with information on the following points:—

(i) why the proposal for conversion of the four units into independent directorates was not placed before the governing body of the Council as a separate item for its consideration as specially desired by the Finance Sub-Committee.

(ii) the reasons for which the units were converted into directorates.

(iii) on what basis the staff of these directorates as increased by 18 to 933 per cent within a short time.

(iv) whether any reduction has been made in their strength and if so how the surplus staff has been disposed of.

(v) the expenditure incurred on these four units during 1968-69.

1.17. The C.S.I.R. have furnished the following replies seriatim :—

"The reasons for not placing the proposal for conversion of the four units into independent Directorates as a separa . Item before the Governing Body of the C.S.I.R. is not known. However, the proposal formed part of the Fourth Five Year Proposal of the C.S.I.R., the Fourth Five Year Plan proposals of the Technical Units were first placed before the Board of Scientific and Industrial Research on 6-10-1965 and then as a part of the proceedings of the B.S.I.R., it went before the Governing Body of the C.S.I.R. on 7-10-1965.

(ii) The Third Reviewing Committee in its Report made the following recommendation in regard to functioning of the Technical Units:—

"In view of the importance of these services, it is recommended that they should be strengthened and expanded with special reference to the following points :

Coordination Units should be organised for contact and exchange of information with ministries and research organisations in Agriculture, Health, Railways, Posts and Telegraphs, etc. The Defence Coordination Unit should add to its responsibilities the encouragement of civil utilisation of results arising out of defence research. The Central Design Engineering Unit should grow into a full-scale organisation for the design, engineering, erection and commissioning of pilot plants and industrial plants in order to assist the industry to bridge the gap between research and application. It should include technical and economic evaluation among its functions. Existing scientific and learned societies should be encouraged and financially supported to enable them to raise the standard of their publications. The servicing activities of the Indian National Scientific Documentation

Centre should be extended and their costs should be reduced. Publications activity of this centre should be examined in the light of abstracts and documentation services available from agencies abroad."

Consequent on the recommendation of the Third Reviewing Committee, proposals for the reorganisation of the Technical Units at the Headquarters of the C.S.I.R. were placed before the Finance sub-Committee of the C.S.I.R. at its meeting held on 26-9-1964 involving their conversion into full-fledged Directorates but the case was deferred. The proposals were again placed before the Finance Sub-Committee at its meeting held on 4th May, 1965.

An extract from the proceedings of the Finance Sub-Committee held on 4th May, 1965 in which the D.G.S.I.R. had mentioned the reasons for further strengthening the units is reproduced below:—

"D.G.S.I.R. pointed out that the Governing Body having already after careful consideration of all aspects, approved the need for central units to step up and coordinate work on (i) design and engineering; (ii) industrial liaison and extension; and (iii) survey and planning of scientific research and having already approved the setting up of these units their further strengthening was essential and important in the context of planning of scientific research, coordination and utilisation of the various processes evolved in the National Laboratories."

The Finance Sub-Committee felt:

"that the matter should be considered further in the Governing Body, after which the requirements of funds could be considered, if necessary."

The Governing Body at its meeting held on 6th May, 1965 while agreeing to provide additional funds for the year 1965-66 for the approved activities of these Units and their further development should be placed separately before the Governing Body at its next meeting.

(iii) The four Directorates came into existence in February/March, 1966 at the C.S.I.R. Headquarters as part of an advance action of the Fourth Five Year Plan. The Fourth Plan proposals of these Directorates included *inter alia* a statement indicating the existing staff and the staff requirements for the next five years.

After consideration of the Fourth Five Year Plan proposals of the Directorates by the B.S.I.R. and Governing Body of the C.S.I.R. at meetings held on 6-10-1965 and 7-10-1965 respectively, additional staff were provided.

(iv) The C.S.I.R. has not made any reduction in the staff strength of the Units. However, one or two individuals have been assigned special jobs on a temporary basis and certain individuals have resigned on their own volition.

(v) The Governing Body of the CSIR at its meeting held on 15th November, 1967 approved the recommendations of the Fourth Plan Committee as commented on by the Group of Scientists that:—

(i) the Directorates should be part of the Headquarters establishment of the D.G.S.I.R. and should be called 'Divisions' and their function is to assit the D.G.S.I.R.

(ii) They should not have Executive Councils;

(iii) They should not have powers like the Directors of National Laboratories; and

(iv) There should be a review of the work done of each of the Directorates; in the case of CD&EO the review could best be done by the Directors of the National Laboratories

The four Technical Directorates thus became part of the D.G.S.I.R. establishment as Divisions at the Headquarters w.e.f. 28-2-1968. Since then expenditure on the Technical Divisions is not being shown as separate items but has been maintained alongwith the CSIR Headquarters expenditure as a whole.

1.18. From the proceedings of the 54th Meeting of the Governing Body, the Committee observe that when this question was discussed the following views were expressed:—

"The Chairman of the Third Reviewing Committee said that the Third Reviewing Committee of which he was the Chairman had never contemplated that the Technical Units at the Headquarters would function as National Laboratories with their own Executive Councils. He was very much surprised to see this development. What the Committee had recommended was some strengthening of these Units as they then existed.

The Deputy Prime Minister and some members asked the question, "How did this happen?"

A member of the Governing Body said that as far as he remembered, the proposal was to set up a small Unit at the Headquarters to assist the Director-General in the matter of co-ordination between industry and the National Laboratories. How the Units became Directorates, he was unable to appreciate.

Recollecting the formation of the Units when he was Vice-President, CSIR, another member said that there was a feeling that the work of the CSIR was not being effectively publicised and that there was no much liaison between the laboratories and industry. It was to assist the Director-General in this task that the Service Units were established at the CSIR Headquarters. But there was no question of making them function like national laboratories with their own Executive Councils. They should function as Director-General's staff organisation. Prof. felt that the work of industrial liaison was not satisfactory and this should be looked into. Some useful work had been done by the Research, Survey and Planning Unit.

Yet another member said that when he was Industries Minister, there were several discussions between him and the CSIR in regard to collaboration and industrial licensing. He was informed at that time that the CSIR Headquarters will have a Unit to coordinate the activities of the CSIR laboratories with the Ministry of Industry; but he was not aware of the establishment of independent Directorates with their two Executive Councils like those of the national laboratories. He said that some useful work was being done and he felt that whatever may be the set-up, divisions or something else, there should be no room for any apprehension that these will suffer from administrative red-tape and protocol considerations will come in the way of scientists.

Prof.....said that he was a member of the Third Reviewing Committee and in a way, he was responsible for the establishment of some of these Units in the CSIR, because there was lack of coordination between industry and the CSIR laboratories and it was also felt that there was need for collecting appropriate statistical data to help the Director-General in his work. This was the background of the creation of these Units. He said the Reviewing Committee had recommended that these Units should be strengthened for example, the Research, Survey & Planning Unit had a staff of about three persons, and now the number was about 30. Strengthening would not mean that they should become independent Directorates. Prof.....added that when the question of functions would be to assist the Director-General in regard to CSIR activities. It was not intended that its activities would cover all scientific research in the country as a whole. This ought to be the responsibility of the Planning Commission. Prof..... added that there were discussions in the Planning Commission on matters with the CSIR regarding the need of data on the staff structure of the CSIR laboratories, such as age, academic qualifications, how many of the research workers had industrial experience etc. The former Director-General, was present in some of these discussions. Prof.....regretted that in spite of repeated attempts, the Planning Comm'ssion could not meet this

information. Prof..... felt that these Units should function as staff Units or staff Divisions to assist the Director-General and not as separate Directorates.

The members were unanimously of the view that there was no question of these Directorates having Directors with the pay scales of Directors of National Laboratories. It was pointed out that the persons in charge of these organisations were serving in the grades of Deputy Directors (Rs. 1600—1900) of national laboratories. There was no necessity for upgrading the posts as the duties and responsibilities cannot be compared to those of Directors of national laboratories."

1.19. The Committee are surprised that the recommendations of the Third Reviewing Committee of the C.S.I.R. for establishing four units at the CSIR's headquarters to strengthen industrial liaison should have been construed to mean that these units should be on the pattren of national laboratories with their own Executive Councils. The Finance Sub-Committee of CSIR had specifically desired in 1965 that this proposal should be placed as a separate item before the Governing Body of the CSIR. This was not done and the proposal was merged with Fourth Plan proposals with the result that it never came up specifically for consideration by the Governing Body. The result was that there was an expansion in staff strength at headquarters ranging from 18 per cent to 933 per cent. The Committee note that it has since been decided that the Directorates should now form part of the headquarter establishment and function as divisions without Executive Councils or the powers enjoyed by the Directors of National Laboratories.

1.20. The Committee have earlier in this Report referred to the proliferation of staff in the CSIR. This case illustrates what proportions this phenomenon has assumed. The Committee would like the CSIR to make an immediate assessment of the extent of surplus and transfer their services to other needy organisations.

II

RESEARCH PROGRAMMES OF CSIR

2.1. With a view to bringing research and industry closer whether, the CSIR organised a get-together of Research and Industry in December, 1965. In that get-together a list of high priority national research projects for various laboratories was drawn up.

2.2. In that get-together it was also decided that there should be a standing machinery in the shape of Technical Research Committee for giving technological support to various industries. These Research Committees were to review standards processes and technology, suggest steps for progressive development of machinery and equipment, review demand and production facilities and identify immediate tasks for research and development.

2.3. The proposed Technical Research Committees were also to demarcate areas where foreign collaboration is no longer necessary and to suggest gradual elimination of services like project engineering, equipment design and feasibility studies from foreign technical collaboration agreements.

2.4. The 'get-together' had also recommended that there should be such get-togethers on an annual basis.

2.5. The 'get-together' between Research and Industry had also made a series of recommendations in regard to research projects to be undertaken in the laboratories to meet defence needs in the field of rubber and plastics, dyes, foodstffs, aeronautical engineering, aircraft structures, materials, propulsion systems and aviation fuel.

2.6. The Committee desired to know the number of high priority projects drawn up in the get-together, number of projects subsequently started and taken up in the laboratories and the number still under examination. In a written reply, the CSIR have stated: "Out of 168 projects recommended by the Get-Together about 40 were already in progress at the various laboratories for which no extra financial provisions were required. Out of the remaining 128 projects, about 11 were not recommended by the D.G.T.D. and the concerned user Departments. The remaining 117 were referred to the Laboratories/Institutes concerned for giving high priority and the Laboratories were also advised to place the proposals before their Executive Councils wherever additional finances were required."

2.7. As regards the setting up of a Technical Committee recommended by the Get-Together, the Director General stated during evidence: "I remember that these Committees were to be established in consultation

with the Department of Technical Development. At the last joint Committee meeting of Industry, there was good deal of discussion regarding the setting up of these Committees and it was pointed out that since there were Development Councils also for various Industries, these Committees should be part of Development Councils. It has been decided that this Committee should be set up by the Department of Technical Development in consultation with CSIR".

2.8. In a written reply, the CSIR have stated as follows:—

"Action for setting up a standing machinery in the shape of Technical Research Committees was initiated with the Ministry of Industrial Development, Internal Trade and Company Affairs and the Development Councils. They were also requested to place the matter before the meeting of the Development Councils for necessary implementation and where there are no such Development Councils, the CSIR was to initiate action. It has been expressed by the Development Councils that the objectives of these Technical Research Committees are already covered by the existing Development Councils and the various Panels. Besides many of the National Laboratories/Institutes have themselves formed separate Panels for clearly defined areas in collaboration with the industries and other organisations concerned and these are meeting quite frequently."

2.9. Referring to the recommendation of the Get-together that there should be such get-togethers on annual basis, the Committee desired to know whether the CSIR had subsequently organised similar conventions. In a written reply, the CSIR have stated: "The Council of Scientific and Industrial Research has not organised any all embracing get-together subsequently similar to that held in 1965. While it served some useful purpose, the Conference was too big to get down to specific problems of individual industries. As a follow up, the Director-General, Scientific and Industrial Research, has been holding a series of meetings with various industries to encourage user participation in the research activities of the National Laboratories/Institutes. Meetings with the following industries have already been held:—

Chemical Industry;
Electronics Industry;
Instruments Industry;
Man-made Fibre Industry;
Non-ferrous Mental Industry.

Similar meetings with refrigeration industry, printing industry, etc. are proposed to be held in the near future. In addition to these meetings, Get-together on specific items/areas are also convened by the National

Laboratries/Institutes from time to time. As an illustration the following are quoted:—

(1) *Get-togethers held at National Physical Laboratory, New Delhi.*

The National Physical Laboratory has held three get-togethers between research workers in the laboratory and those from industry.

The first get-together was held on 'Thermometry' in February, 1967 and this was followed by another one on 'Weights and Balances' held in December, 1968. The third get-together on Lumps, Lighting, Fittings and Colour Glasses was held on 9th and 10th December, 1969.

(2) *Get-together held at Central Mechanical Engineering Research Institute, Durgapur.*

The Central Mechanical Engineering Research Institute, Durgapur held a get-together on "Research & Development for Self-Reliance in Engineering Industries on 8th March, 1970."

2.10. A committee set up to review the working of the pilot plants in CSIR (the Kane Committee) made the following observations about the working of the laboratories:

"It is understood that when the CSIR decided to locate some of the National Laboratories near large industrial centres, it was their expectation that a close liaison would develop between such industries and the Laboratries and that a considerable amount of research would be sponsored by the industry in the adjacent laboratories. It is also understood that in order to establish such close liaison, the representative of such industries were often included as members on the Executive Councils, Scientific Sub-Committees and Advisory Panels of the Laboratories, as also as their Chairman. In actual practice, however, this expectation has not been realised. For example, at Jamshedpur, although the NML is located in close proximity to the Steel Works of TISCO, apparently not only have no Pilot Plants been sponsored by TISCO at the NML, but they have established a large research centre of their own. Similarly, although the CFRI is in close proximity to the Sindri Fertilizer Factory and the Planning & Development Department of the latter is concerned with the use of coal, including the design of plant for the production of synthetic gas for ammonia, there seems to have been little liaison between the two units, for R&P work. As a result, no use has been made of the Koppers and Lurgi coal gasification plants at the C.F.R.I. by Sindri in spite of the commitment of the FCI to design and construct fertilizer plants based on coal.

It is noteworthy that many public sector undertakings for example FCI (Sindri), FACT and HAL, have set up extensive R&D facilities under their own auspices. The Synthetic Drugs Plant at Hyderabad was also to overcome its initial production problems only because it had extensive Pilot Plant facilities, available within the organisation."

The Committee observed that there was considerable reluctance even by Government Departments to sponsor research at the National Laboratories.

"Pursuant to a decision taken at the 54th meeting of the Governing Body of C.S.I.R. held on 25-11-1967, 'a Committee under the Chairmanship of Shri Arvind N. Mafatlal, then member of the Governing body was constituted by the Vice-President of CSIR to consider measures for bringing industry and science close to each other.' The Committee enquired whether this Committee had finalised its report. In a note, the CSIR have stated that 'this Committee has not yet finalised its report'."

2.11. The Committee are of the view that the CSIR, which was set up with a chain of laboratories to serve as the premier centre for applied industrial research in the country, has failed to establish adequate rapport with industry. The expenditure on this organisation since the beginning of the Plans has amounted to Rs. 146.76 crores* but the returns on this investment have been meagre.

2.12. How isolated the organisation is from the country's industrial milieu and how feeble its impact on industrial production would be evident from the findings in a later section of this Report. The Kane Committee expressed the view that facilities created in the national laboratories located near industrial centres have remained unused by industries, despite representation of industrial interests on the Executive Councils of the laboratories, scientific sub-committees, Advisory Panels etc. As an illustration of this situation, they cited the National Metallurgical Laboratory at Jamshedpur, where not a single pilot project was sponsored by the steel industry in that area. On the other hand the industry preferred to develop its own research centres on a large scale.

2.13. It is not only the commercial sector which has remained aloof from the laboratories. The Kane Committee pointed out that "there was considerable reluctance even by Government Departments to sponsor research at the national laboratories". The Central Fuel Research Institute was set up in close proximity to the Sindri Fertilisers which, however, preferred to establish its own planning and development department. The Kane Committee found "little liaison" between these two research units in their work.

*Vide p. 63 : Supplementary Agenda for the 60th meeting of B. S. I. R. (May, 1969).

2.14. The Committee are aware that this situation is not entirely of CSIR's making. But it would appear that the organisation has not been sufficiently responsive to the needs of industry. As early as 1965, it organised a 'get-together' with industry, as a result of which 168 priority research projects were formulated. 40 of these projects were "already in progress" at that time and another 11 were dropped. The remaining 117 are stated to have been referred to the laboratories "for giving high priority": apparently they are yet to get under way.

2.15. Following a suggestion made at the meeting of the Governing Body of the C.S.I.R. in November, 1967, a Committee was set up "to consider measures for bringing industry and science close to each other". This Committee is yet to finalise its report.

2.16. The Committee feel that the existing situation is most unsatisfactory, as it has led to the laboratories functioning in a vaccum. Urgent remedial measures are called for and the Board of Scientific and Industrial Research and the Governing Body of the C.S.I.R. should promptly move in the matter. The Committee have later in the Report made certain suggestions in this regard.

2.17. Indicating in concrete terms the lines for re-orientation of CSIR's research programme so as to bring them more closely in tune with the country's developmental requirements, the Third Reviewing Committee had referred to problems of import substitution and export promotion as areas in which CSIR's research activities should be concentrated. In the 'get-together' that was organised in December, 1965, one of the recommendations made was that "those items that drain more than Rs. 1 crore per year foreign exchange should be brought under the specific charge of nominated project leaders who would be responsible for establishing within six months ways and means to plug the drain by survey of available techniques and location of available capacities." The Committee desires to be furnished with a statement indicating the major import saving projects on hand and those projects which had tangible results during the last five years. The CSIR have furnished a list of 185 projects in hand and 166 import saving projects which have been completed and produced "tangible results".

2.18. During evidence, the Secretary, Industrial Development stated, "It is not correct to say that we do not have import substitution. We have a very high degree of import substitution now. The absolute figure of foreign exchange requirement goes up because of the general development of the country and the total production is much higher. Therefore, even percentage-wise if you take many industries where import substitution has been done to a great extent, a negligible amount of foreign exchange is

required by many industries. Taking measures to step up import substitution is one of the tasks which is constantly engaging the whole organisation of the Director General of Technical Development and in which we have the support of CSIR also."

1.19. The Committee drew attention to an article in *Yojana* of April, 1969 where it had been estimated that in 1967-68, 70% of finished fertilisers, 60% of crude oil, 70% of alloy and special steel, 10 per cent. of mild steel, 30% of aluminium, 75% of copper, 75 per cent. of newsprint etc. were met by imports. The Secretary, Industrial Development stated: "The import substitution... in that context is not manufacturing capacity, but it is the production of processes, production of raw materials for which we are at present dependent on outside. That certainly is the function of the CSIR and DGTD to promote all measures so as to substitute materials which are at present being imported, whether indigenous materials cannot be used in their place and to create capacity for the production of those materials. The larger question is: suppose we need 2 million tonnes of a particular product and we have a capacity of one million tonne. Then we should set up manufacturing capacity for another one million. That is a part of the Fourth Plan and it is looked after by Planning process depending on the targets of resources."

2.20. The Committee desired to know the nature of co-ordination between the CSIR and the Directorate General, Technical Development. The Director General, Technical Development stated: "I would like to mention that the officers of the DGTD are on the Governing Councils of various research laboratories. I am also on the Governing Council of the CSIR. Thus we take part in bringing the industry and CSIR laboratories together. You recently heard about the silicon carbide. In that particular case it was the DGTD who was trying their best to persuade the industry to take that particular process and develop it rather than asking for the imported technical know-how. In the same way in various other items also DGTD officers are assisting the CSIR to definitely bring the industry and the CSIR together. Also I would like to mention that we also do think about ourselves as to what are the problems of the industry and we send those problems to CSIR. A number of problems are sent to CSIR and they take up those problems which are considered to be more practical problems. I would like also to mention that in recent years we are represented in the committee which decides whether projects proposed by Laboratory are practicable and we participate in those discussions to decide about what research should be undertaken by the CSIR laboratories. In that way we act in close contact with the CSIR and try to bring the industry and the CSIR together".

2.21. The Committee drew attention to the observations of a Committee appointed in November, 1966 to scrutinise the Fourth Plan proposals. That Committee took note of the general feeling that existed

"in the country that some of the research laboratories had undertaken programmes over a wide range of subjects and that there was great scope of regulating the research programmes in the light of national priorities." That Committee suggested that programmes of research undertaken in each laboratory or group of laboratories should be reviewed by a Committee of Experts to suggest modifications and priorities for new projects. The Committee asked whether any Expert Committee had been constituted to review the work of the laboratories. The Director General, CSIR, stated: "No special Review Committee has been appointed..... We have circulated the findings of this Committee to all laboratories and the executive councils and in the formulation of the programme the Scientific Sub-Committee that is responsible for the detailed preparation of the programme is very much aware of that. We are insisting on doing fewer things but well. We are trying to see that our effort is not diffused."

2.22. The Administrative Reforms Commission in its report on the 'Machinery of Government' took note of the "criticism repeatedly levelled of the gap which exists between industrial research and its application by industry" and came to the conclusion that "the major factor responsible for this gap is the inappropriate location of CSIR." The Commission went on to observe "Since the major responsibility of C.S.I.R. is to cater to the needs of industry and its programmes are to be oriented to industrial requirements, there is not much merit in the argument that it should be located in the Ministry of Education....It is, therefore, necessary to shift the CSIR from the Ministry of Education and place it in such a position as will ensure a continuous dialogue between CSIR laboratories and their user industries and thus facilitate an effective link between industrial research and its practical application." The Committee asked about the action taken by Government on the recommendation of the Administrative Reforms Commission. In a written reply the CSIR have stated that "the recommendations contained in the Report of the Administrative Reforms Commission are receiving the attention of Government."

2.23. The Committee pointed out that from the proceedings of the 54th meeting of the Board of CSIR held in November, 1967, one observes that there is a feeling that CSIR's efforts are being "diluted by spending time and resources in developing processes which were already known." The view was also expressed in the 55th meeting of the Governing Body held in May, 1969 that "much of the work done at National laboratories related to redoing of known processes." Attention was also drawn to the fact that "there were very few projects in the National laboratories which could be considered new. Most of them were either rediscovering or reinventing known processes or products." The Committee desired to know what steps were taken by the CSIR to ensure that their research programmes centred round new techniques and new developments and were not connected with process already known or developed. The Director

General, CSIR stated "The mechanism by which this is ensured is through our Scientific Sub-Committees, executive councils. They have also several panels in regard to the industries. Ultimately they are considered by the Executive Council whose reports are circulated to every member of Government. I have a feeling that in the last few years or so there is greater awareness to reduce the redoing also. I would mention one thing. Sometimes knowledge may be in the possession of certain manufacturing firm. It may not be available to we people. In such a case it will be a case of redoing. If the information is not disclosed. And we cannot sit idle and go on waiting till somebody discloses that knowledge. Some exceptions have to be made. I certainly agree that in such cases there is some redoing." Asked if the proper control was exercised to check this, the witness stated: "We have been taking stock of things and striving to set things right." In a written reply, the CSIR have stated as follows:

"The question of inter-laboratory collaboration has been one of the subjects considered at the Conferences of the Directors of National Laboratories from time to time. In particular, this subject was discussed in depth at the Directors Conference held at National Aeronautical Laboratory, Bangalore on 4-5 July, 1966 and Central Fuel Research Institute, Jealgora on 8th and 9th November, 1967. Guidelines formulated at these Conferences have been circulated to all the National Laboratories/Institutes Research Associations.

In the recent past the Vice-President, CSIR (Minister of Education and Youth Services) held a series of meetings with Groups of Directors of National Laboratories/Institutes and Industrial Research Associations working on allied subjects. The whole idea behind the group meetings was to have personal and intimate discussions with the Directors and bring together National Laboratories/Institutes which are doing research on allied subjects. It is proposed to hold such group meetings frequently so that Directors of allied laboratories may have the opportunity to consider each other's work and programme with a view to avoiding duplication of work. Collaboration between the various National Laboratories/Institutes is a continuing process and necessary steps in this direction are under constant review.

The Agenda and Proceedings of the 55th meeting of the Governing Body held on May, 1969, which included the supplementary Agenda for the 60th meeting of the BSIR as well, were duly forwarded to all the National Laboratories of the CSIR on 16th September, 1969 for their information and guidance.

It appears that there had been no duplication of work due to lack of knowledge since most of the Directors were generally aware of what was happening in other laboratories. But in some areas, especially in basic research, duplication is unavoidable and even desirable.

Member (Science), Planning Commission has also been holding Inter-departmental meetings for avoiding duplication of work. So far meetings in the fields of—

(i) Air-borne geophysical surveys;

(ii) Silicon; and

(iii) Silicones

have been held. It is proposed to hold a similar meeting in the field of Seismology to define the sphere of work of India Meteorological Department, Regional Research Laboratory (Jorhat) etc."

2.24. From the papers supplied to the Committee, it is seen that at a meeting held in January, 1969, by the Planning Commission, the view was taken that there are several areas of overlap between CSIR laboratories as shown under:

1. Industrial Microbiology	IIEM, NCL, CFTRI, RRL (Jammu)
2. Protein Food	CFTRI, NBG, RRL (Jorhat), IIP
3. Medicinal/Aromatic Plants	NBG, CIMPO, RRL (Jorhat), RRL (Jammu)
4. Fuel	CFRI, RRL (Hyderabad), RRL (Jorhat)
5. Fruit Preservation	CFTRI, RRL (Jorhat), RRL (Jammu), RRL (Bhubaneswar)
6. Chemical, Petro-Chemical and Petroleum	NCL, CECRI, RRL (Hyderabad), RRL (Jorhat) and IIP
7. Materials (Polymer and Plastics)	NCL, RRL (Hyderabad) and IIP
8. Instruments	NPL, CEERI, IIIM, CMERI, NAL CSIO, NGRI.

2.25. The Committee desired to know the steps taken to ensure proper coordination of research activities and to eliminate duplication of research effort. The Director General, CSIR stated during evidence: "In regard to avoiding duplication one step that we have taken is this. Programmes from various laboratories are circulated to other laboratories so that they know what particular programme is followed by a particular laboratory. Of course a few things came to our notice and in those cases we have appointed small committees—take for instance silicones and so on. In regard to these we are avoiding duplications in the laboratories of the CSIR. In the case of silicon, for instance, research is done in Atomic Energy Department; there is National Physical Laboratory and solid State Physics Laboratory under the Ministry of Defence. There are other laboratories also who are doing some work. For this purpose we have appointed a Committee under the Chairman of Member (Science) Planning Commission. All the directors attended the meeting and they explained what particular work was being done by such and such a laboratory.

And they have such and such process and material. An understanding has been arrived at that this particular aspect of work will be done by particular laboratory 'A'. Similarly there was also a Committee which looks into ferrites and electronics components in the NPL. They all came to an understanding for avoiding duplication. Here it is a question of several fundamental scientific principles being investigated involved and so I do not mind if there is some duplication. Let several people do it and get solutions. But when it comes to large equipment and personnel for certain project then duplication should be avoided."

2.26. In a written reply, the CSIR have stated as follows:

"Cooperation and co-ordination between the Council of Scientific and Industrial Research and Defence Research and Development Council are maintained in the following manner:

(i) DG, CSIR is a member of the Defence Research and Development Council and similarly the Scientific Adviser to the Ministry of Defence is a Member of the Governing Body of the CSIR and the Board of Scientific and Industrial Research.

(ii) Senior scientists from CSIR are nominated on the various Defence R&D Panels and the Governing Councils which have been constituted for R&D Establishments/Laboratories to review and guide the R&D activities in specified fields.

(iii) Similarly senior scientists from the Defence Research and Development Organisation are serving on the Executive Councils and Committees of the various Laboratories under the C.S.I.R.

(iv) In addition, a Defence Coordination Unit has been set up in CSIR to coordinate the research and development programmes with those of defence requirements. The Unit maintains close liaison with the Defence R&D organisation to identify and allocate problems to the various national laboratories. The Unit acts as the focal point of scientific and technical problems of defence interest in which national laboratories can offer assistance."

"To ensure elimination of duplication of research effort more effectively, the following proposal has been put up for the consideration of the next meeting of the Steering Committee to be held on March 13, 1970:

'that before putting up a new proposal for consideration of the Governing Council of concerned R&D Establishments, the Defence Coordination Unit of the CSIR should be contacted 2-3 months in advance by the Defence R&D Headquarters

(Department to be specified) for obtaining information whether or not any work on the item (with well defined and specific parameters/composition and uses as far as defence is concerned) has been taken up or completed in any of the CSIR Laboratories. Then, if necessary, the proposal may be included in the agenda of the Governing Council and Panels along with comments from the CSIR'.

"A Coordination Committee has been set up under the Chairmanship of the Minister of Health for coordination and collaboration between the CSIR and the Ministry of Health. The Director General, ICMR as also Directors of the laboratories of ICMR are represented on this Committee. The Director General, ICMR is also member of the Board of Scientific and Industrial Research of the CSIR whereas the Director General, CSIR, is a member of the Governing Body of the ICMR. Scientists of ICMR are also represented on the Executive Councils of National Laboratories.

Scientists of the Department of Atomic Energy are represented on some of the Executive Councils of the National Laboratories/Institutes."

2.27. The Committee desired to be furnished with a statement showing the particulars of problems referred to the CSIR by the various public undertakings and private parties during the last five years and their outcome. The Committee note the following position from the statement furnished by the CSIR:

S. No.	Name of Laboratory/Institute	No. of problems referred to by Public Undertaking/ private parties during the last five years
1	2	3
1	Central Building Research Institute, Roorkee	40
2	Indian Institute of Petroleum, Dehradun	59
3	Central Instruments Organisation, Chandigarh	8
4	Central Drug Institute, Lucknow	5
5	National Geophysical Research Institute, Hyderabad	27
6	Regional Research Laboratory, Hyderabad	50

1	2	3
7	Central Public Health Research Institute, Nagpur	44
8	Central Electronics Engineering Research Institute, Pilani	7
9	Central Fuel Research Institute, Jealgora	66
10	National Aeronautical Laboratory, Bangalore	41
11	National Metallurgical Laboratory, Jamshedpur	108
12	Central Salt & Marine Chemicals Research Institute, Bhavnagar	14
13	Central Road Research Institute, New Delhi	136
14	National Physical Laboratory, New Delhi	96
15	Central Food and Technological Research Institute, Mysore	271
16	Central Glass and Ceramic Research Institute, Calcutta	15
17	Central Electric Chemical Research Institute, Karaikudi	38
18	Structural Engineering Research Centre, Roorkee	98
19	Central Mining Research Station	80

2.28. The Committee feel that there is need for revamping the research programme of laboratories so as to bring them in tune with the priorities arising out of the country's developmental plans. A Committee set up to review the Fourth Plan proposals of the C.S.I.R. took note of the general feeling that "some of the research laboratories had undertaken programmes over a wide range of subjects and that there was great scope of regulating the research programmes in the light of national priorities." If this is to be successfully achieved, the Committee feel that there should be close and continuous contact between the CSIR and organisations like the Planning Commission and the Director General of Technical Development. A suggestion worth consideration in this context is the proposal made by the Administrative Reforms Commission that the administrative control over CSIR should be shifted to "such a position as will ensure a continuous dialogue between the CSIR laboratories and their user industries." The Committee note that this suggestion is already receiving Government's attention.

2.29. In any plan for re-orienting research work in the laboratory, the Committee feel that the needs for import substitution and export promotion should receive major emphasis. This would be facilitated only if the Director General, Technical Development keeps in close contact with the organisation and refers to the laboratories specific proposals in the field.

2.30. No less important in the Committee's view is the need to ensure that the research efforts in the laboratories centre round new techniques, as a complaint often made against the laboratories is that they are "either re-discovering or re-inventing known processes or products." The Committee have examined this issue in relation to pilot projects in the laboratories later in this Report.

2.31. Another point that has come to the Committee's notice is the over-lap in research between laboratories. The data given earlier in this Report would show that in as many as eight disciplines, there were two, three and in one case even eight laboratories whose work overlapped. A certain amount of overlap is perhaps inevitable in any research effort, but the matter calls for constant and continuous review.

III

FOREIGN COLLABORATIONS

3.1. A view was expressed before the Special Session of the Governing Body of CSIR held in January, 1965 to consider the Third Reviewing Committee's Report that "after having developed the indigenous know-how and specialised techniques, the current Licensing System of the Government of India is that the D.G.T.D. can have their own way without utilising the indigenous technical process developed by CSIR laboratories. In some cases even if indigenous process is available, whose technical feasibility and economic acceptability have been fully established and recognised by industry, the industrial processes are licensed on the basis of foreign technical collaboration." The P.A.C. had drawn attention to this situation in para 1.113 of their Fifty-Ninth Report (Third Lok Sabha) where they referred to several schemes involving foreign collaboration which were approved against the advice of CSIR. In paras 1.10 and 1.11 of their Seventy-Fifth Report (Fourth Lok Sabha) the P.A.C. had also pointed out that approval for foreign collaboration in fields where indigenous know-how has been established would be detrimental to the country's interests.

3.2. Referring to the cases referred to in the 75th Report of the P.A.C. (Fourth Lok Sabha), the Secretary, Industrial Development stated: "The CSIR themselves did not protest in some of these cases." The witness added that: "in about 90 per cent of the cases, the CSIR's advice is accepted, and if there is any impression that we just ride roughshod over the advice of the CSIR, I would strongly like to correct it. There are cases undoubtedly where we have ignored the advice of the CSIR. I will give an illustration of the sort of reasons which sometimes weighs with us in not accepting the CSIR's advice. Out of those 18 cases, there is one case where a Company, which has 100 per cent foreign capital, was given a licence for the manufacture of a cough mixture against the advice of the CSIR. This was done because they were very anxious to reduce the foreign equity of this company, and this company reduced its foreign equity by 40 per cent. In the larger interests, it would be much more important to see that the Company, which has a 100 per cent foreign equity was brought down to 60 per cent of that amount, and in that case there was absolutely no technical royalty fee or any such thing."

"Therefore we felt that it was a small price to pay to allow them to make some cough mixture if we could in the process induce them to bring down their equity from 100 per cent to 60 per cent. These economic and other considerations do sometimes come into the picture and on these considerations we have sometimes not accepted the advice of CSIR."

"We also allowed instant tea and coffee to be manufactured with some foreign collaboration in which case the foreign exchange payment is Rs. 2 lakhs and the earning of foreign exchange Rs. 50 lakhs every year. We know that instant tea and coffee are not sold in India; therefore we allowed this on the explicit assumption that hundred per cent of the product would be exported."

"Where a very large amounts of foreign exchange earnings are involved, I think, it may be better to take the larger economic interest into account and sometimes say that foreign collaboration will be permitted. But if there is any impression that we just ignore the advice of the CSIR, I would strongly say that that is not correct."

3.3. The witness added "If the CSIR is going to take three or four years to develop a process and meanwhile heavy imports are involved and if foreign technology can give us that production in a year or so, we are in a quandary whether we should take a long range view or a short range view. All these considerations have to be weighed by the Licensing Committee in coming to a decision. But by and large the decision is in favour of what the CSIR recommends."

3.4. Asked whether any guidelines had been laid down for deciding on foreign collaboration, the Secretary, Department of Industrial Development stated: "Broadly the line is there. There was, for instance, a report of the Mudaliar Committee on foreign collaboration and there was a Government Resolution accepting that report. Most of the guidelines are there in the Mudaliar Committee's Report. It is, at a point of time and in a specific case a question of balancing as to where the greater advantage lies. If we get very sizeable foreign exchange savings, we may have to concede occasional foreign collaboration even though we know that in the course of the next three or four years some process might be developed indigenously." The witness added: "Recently, Government have also laid down guidelines for the Foreign Investments Board in some detail. These have been approved by the Cabinet." In a communication on this point the Ministry of Industrial Development have further stated: ". . . . import of technology is allowed only after ensuring that the same or similar technology is not indigenously available and the views of the CSIR are invariably obtained in each case. Normally, when know-how has been indigenously developed in the CSIR laboratories and is suitable for commericial exploitation, foreign collaboration is not permitted. A representative of the CSIR is as a rule present in the meetings of the FIB or its Sub-

Committee where an overall view is taken of the proposal as a whole in the light of the various aspects involved. The CSIR's views are also discussed and a final overall decision is taken by the FIB as a whole.....In order that intending foreign collaborators should be fully aware of the scope for foreign investment and collaboration, Government have announced certain guidelines indicating the industries (a) where foreign investment may be permitted with or without technical collaboration; (b) where foreign technical collaboration may be permitted but not foreign investment; and (c) where no foreign collaboration (financial or technical) is considered necessary. The likely range or royalty rates in respect of the first two categories which should be acceptable to Government has also been indicated....Guidelines have also been separately issued to the concerned Sections/Departments/Ministries regarding the policy and procedures to be followed in processing of such applications."

3.5. The Mudaliar Committee on Foreign Collaboration which conducted the policy to be followed for foreign collaborations *inter alia* made the following observations:

"A primary question which of late has been increasingly arising in dealing with the proposals for import of foreign know-how is whether there is an alternative indigenous technology available to the entrepreneur. Some of the basic questions which have to be taken into account in assessing the suitability of indigenous know-how are:

(i) Has the indigenous know-how been commercially processed or is at least capable of commercial exploitation within a reasonable short period?

(ii) Is the know-how economical from the point of view of the investor and from the national point of view?

(iii) It is likely to be made available to the new entrepreneur or is the know-how available only to another existing manufacturer, who is reluctant to part with the know-how to a competitor?"

"Under the existing procedures, both the Directorate General of Technical Development and the Council of Scientific and Industrial Research are associated with the consideration of applications for approval of foreign collaborations. The CSIR normally brings to the notice of the authorities concerned the existence of indigenous know-how which has either been developed in one of the National Laboratories or is available elsewhere with existing manufacturers. It has been alleged before the Committee by various Chambers of Commerce and Industry that in many cases, CSIR has not been taking a broad view regarding the availability of

indigenous know-how, and that even in the cases where the indigenous know-how is restricted to the laboratory stage or its commercial possibilities have not been fully proved, foreign collaborations have not been recommended, with the result that entrepreneurs have had to give up their schemes, resulting in continued import of the product; instances were also cited where entrepreneurs, after attempts to utilise the indigenous know-how, had to give up the projects as not being commercially feasible."

"It is of course necessary that indigenous technology, which is capable of commercial exploitation, should be fully utilised. Both at the licensing stage and the Foreign Agreements approval stage, a scheme based on indigenous know-how should normally be given preference to one based on imported know-how. But while insisting on the utilisation of indigenous know-how to the exclusion of imported know-how, it is important that adequate consideration should be given to the issues raised in para 7.1. The Committee would recommend that in all cases where CSIR is of the view that owing to the availability of indigenous know-how, no foreign collaboration should be allowed, it should be a convention that there should be a prior discussion between the concerned officers of the DGTD and of the CSIR, before a recommendation is made to the Foreign Agreements Committee, instead of as at present, both the agencies expressing their views independently. If, at the normal operating levels there is a difference of opinion between the two organisations, a discussion should be arranged at the level of the DGTD and the DG, CSIR, if necessary, so that an agreed recommendation is made to the Foreign Agreements Committee. Care should, however, be taken to ensure that such discussions do not lead to avoidable delays in the finalisation of the cases. In case of difference of opinion between the CSIR and the DGTD, the case should promptly be brought up before the Foreign Agreements Committee."

3.6. The Committee asked if it would not be better in the long run to wait for some time in case where process was under-developed, rather than allow foreign collaboration. The witness stated: "I have before me about eight cases where we have stalled and refused foreign collaboration for period varying from two to five years in the expectation that some indigenous process was being developed. From 1962 or 1963 we have just gone on refusing it but there must come a time when either the process is discovered in India or we do not continually go on importing it. Please do not get away with the impression that we try to stultify Indian research. There is nothing of that sort. We are just as much conscious of the importance of developing Indian research as any body else." Referring to manufacture of television sets, the witness stated: "We were under very heavy pressure to allow foreign collaboration for television sets. We were told that the foreign television set was very much cheaper.

3.7. The Committee asked whether the Department of Industrial Development had under consideration any proposal for the manufacture of silicon carbide with foreign collaboration which has been successfully developed by the Regional Research Laboratory, Hyderabad. The Secretary, Department of Industrial Development stated, "There are applications still pending with us but we have decided that we must wait and see the result of CSIR's experimentation with the pilot plant." The witness added that "the application by the party was made in February 1967. We have not allowed the party foreign collaboration and the party is still not willing to take this process."

3.8. The Director General, C.S.I.R., stated: "I am of strong view that if the technology of production and if the knowledge of the operation and facility of designing and fabricating of equipment are available in the country, then certainly there is no case of allowing any foreign collaboration, technical or financial. But in those cases, where it takes a rather longer time to develop know-how, I think the situation would be that foreign exchange would have to be spent on the import of that material and this may create difficulty."

3.9. The Committee have in paragraph 1.11 of their Seventy-Fifth Report (Fourth Lok Sabha) already emphasised the need for ensuring that foreign collaborations are not approved in fields where indigenous know-how has developed adequately. The Committee note that Government have streamlined the arrangements in this regard to ensure that if a know-how suitable for commercial exploitation has been developed in the C.S.I.R. laboratories, foreign collaboration is not permitted.

3.10. The Committee would like to point out that the CSIR on its part has an obligation to establish the commercial viability of processes developed in its laboratories, while urging its cause before the Foreign Investment Board. Later in this Report, the Committee have referred to the experience of Bharat Electronics which undertook the production of ceramic capacitors based on know-how developed in National Physical Laboratory but found the process "so unworkable and uneconomic" that it was obliged belatedly to seek foreign collaboration. The Mudaliar Committee on foreign collaborations also referred to complaints that "CSIR has not been taking a broad view regarding the availability of indigenous know-how" and had pressed "cases where the indigenous know-how is restricted to the laboratory stage or its commercial possibilities had not been fully proved." It is, therefore, essential that processes developed in the laboratories are adequately proved with the help of competent design and consultancy services available.

IV

PROCESS AWAITING COMMERCIAL EXPLOITATION

4.1. In para 1.113 of its 59th Report (Third Lok Sabha), the Public Accounts Committee had pointed out that out of 494 scientific and industrial processes developed by the CSIR, only 89 were in actual production. The Committee had, therefore, suggested that greater care should be exercised in future in selecting processes for development.

4.2. From the data about research utilisation published by CSIR, it is seen that as on 1st April, 1967, 135 processes released to various parties were in production (some with nil production or token production) and 95 processes released to various parties were still to go into production. Out of these 95 processes, 23 processes were released in 1964 or earlier years and one as early as 1958.

4.3. It is also seen that as on 1st April, 1967 240 processes were available for exploitation.

4.4. The Committee desired to be furnished with information on the following points:—

(i) A statement showing the total number of processes developed by the CSIR, number of processes released to the industries, number of processes in actual production and the number of processes yet to be released as on 1st April 1968 1st April, 1969.

(ii) Whether the CSIR have investigated why a number of licensed processes have not gone into production and if so what the findings are.

(iii) Whether CSIR have considered whether it would be possible to release the unused processes to other parties following the suggestions made by the PAC in para 1.20 of their 75th Report (Fourth Lok Sabha).

(iv) How many of the unused processes have since found users who are willing to exploit it.

4.5. In a written reply, the CSIR have stated as follows:—

"Under the agreement with the National Research Development Corporation, exploitation of results of research undertaken by the CSIR laboratories, patents and processes is normally done through the NRDC.

4.6. A statement showing the total number of processes developed at CSIR's laboratories and referred to NRDC for commercial exploitation, released to industries through NRDC and in production etc., as on 1st April 1968 and 1st April 1969 is given below:—

	As on 1-4-68	As on 1-4-69
1. Total processes referred	735	807
2. Processes dropped/withdrawn	166	175
3. Processes released free	110	120
4. Processes for which licenced determined or expired	39	42
5. Number of effective inventions	420	470
6. Processes licensed and in production	98	115
7. Processes licensed but not in production	86	114
8. Processes yet to be licenced, where further work is in progress, or which are under negotiation".	236	241

4.7. It has been further stated that "some of the processes licensed by NRDC have not gone into production for a variety of reasons. The progress reports of licencees are sought every now and then. On the scrutiny of these progress reports, the reasons for not going into production can be broadly classified into the following headings:—

(a) Since the laboratory work is conducted on small-scale, the entrepreneurs find difficulty in scaling them up.

(b) There are certain difficulties in the import of capital goods and raw materials.

(c) Licensees sometime find difficulty in collecting engineering data and preparation of project reports since the consulting engineering firms have very recently come up and are not fully equipped with such type of work.

(d) Lack of demand."

"The policy of NRDC is to grant normally non-exclusive licences and irrespective of the fact whether the licensees go into production or not, other firms are licensed who have satisfied themeslves with the investigations carried out and are convinced that they would be in a position to make the process a success."

"Suggestions made by P.A.C. in para 1.20 of their 75th Report is always kept in view. Even in cases where an exclusive licence is granted, a provision in the licence agreement is made that if the licensee fails to establish commercial production within the stipulated period, the licence will automatically be converted into a non-exclusive one and the Corporation will be free to grant further licences at its discretion."

"As regards the quantity of production no precise information can be given since most of the processes which are licensed by NRDC are on the non-exclusive basis. It is possible that sometimes the first licensee may not have gone into production for various reasons but a later licensee may have gone into production."

4.8. The Committee asked for a statement showing the installed capacity of the processes in production and the annual production during the last three years. In a written reply, the CSIR have stated: "Under the Agreement with the NRDC, exploitation of results of research undertaken by the CSIR Laboratories patents and processes is normally done through the NRDC.

The NRDC has intimated that :

> "they do not stipulate any restriction on the installed capacity of its licensees; it only grants licences for the right to use the know-how."

4.9. The NRDC have furnished a statement showing the annual production whether the figures are available. The Committee note the following from the statement:—

Year	No. of processes	Value of production	Remarks
1966-67	33	3,71,31,504	There was no production in one case.
1967-68	62	3,71,93,940	There was no production in 11 cases
1968-69	47	3,67,12,567	

4.10. During evidence, the Director General, CSIR stated: "There are about 500 processes out of which about 80 or 90 have been put into use. It may be that the remaining ones too might be put to use after sometime. Perhaps there might be some flaw still or some lacunae in which case they have not since been put to use. After all the scientist works out a process. It may be that due to some reasons it may not be economically feasible. The point is what sort of control do we exercise on this? Our resources are limited. With these resources it may not be possible for us

to get all the things done. My colleagues are very well aware of it and they are trying, as far as possible, to reduce the number of such types of work. What is important is to show whether a process is capable of being utilised, or we are very well aware of it. There is no control in the real sense of the word control. The Members of the Executive Council take care of this."

4.11. According to information furnished in reply to Starred Question No. 423, which was answered on 5th August, 1969, the value of products turned out by processes released by CSIR was Rs. 453 lakhs in 1966-67. The Committee asked whether this was not too small a return on investment in laboratories considering that the national industrial output was of the order of Rs. 5,000 crores. The Director General stated: "This is only one aspect of the work of a research laboratory, or instance, if there is a laboratory, which has done some work in connection with evolution of a certain raw-material and this leads to utilisation of that material I do not think that work on evolution itself will ever be counted in terms of the impact on production but that work will be of great importance in locating a certain material in finding its usefulness for industrial production. Therefore, this figure of Rs. 5 crores is only one aspect of research laboratory's work. There is another aspect of research laboratory's work, *i.e.* creating knowledge about the application of certain materials and products and, I think, these are fields which somehow cannot be counted in terms of money."

4.12. The Committee drew attention to observations of the Estimates Committee made in para 43 of their 103 Report (1965-66) that there has been delay of 7 to 9 years in handling over the process after their successful completion by the National Physical Laboratory to NRDC and, thereafter there had been further delays of one year to three years in giving the processes for commercial exhibition by the NRDC. The Director, N.P.L. stated: "There processes referred to the stage when the Laboratory had just started applied research work and I would like to ensure you that since in the last 4 to 5 years the Director General has brought our attention and focussed our attention to more applied research and that we must do excellent work in relevant fields, we have been trying to focus our attention to the maximum and fastest utilisation. The stage has been reached in National Physical Laboratory that for Electro-photostat copying machine which we have developed and have made one proto-type today about 2 dozen industries are prepared to take it as it is. Similarly for silicon which we have now made having a quality good enough for all transistor work. Many industries have already approached us. Now, the processes are being taken even from the Laboratory stage."

4.13. The Committee asked whether there were similar cases in other laboratories. The Director General stated: "I think this must have been an extreme case."

4.14. The Committee, however, observe that the Kane Committee on pilot plants have given two instances of delay in utilisation of know-how, one of which was ultimately given up. The particulars of these cases are as under:

"A process for producing Vitamin C was worked out on a laboratory scale by the NCL during 1959 to 1961. At the same time, *i.e.*, in April, 1959, a private company was licensed to produce Vitamin 'C' with overseas collaboration. This company commenced production with a capacity of 60 tons in 1962; it was permitted to expand its capacity to 90 tons in 1966 and on the basis of actual performance, its capacity was amended to 120 tons in 1967. When the NCL suggested in 1961 that a production unit for Vitamin 'C' may be set up on the basis of its own know-how, it was decided in the Ministry of Industry in 1962 that before erecting a commercial plant, a pilot plant be set up by the Hindustan Antibiotics Ltd., (HAL), a public sector undertaking, at Pimpri, under the joint supervision of officers of the HAL and the NCL. During investigation of the Pilot Plant project, considerable modifications had to be made in the process. A joint report substantiating the proposal to set up a production unit was submitted to Government in 1965 and an industrial licence was issued to HAL for a capacity of 50 tonnes. This licence was increased in 1966 to 125 tonnes. Presidential sanction for implementation of the project was received, however, only in November, 1968, and it is likely that production will not begin before 1971. Thus, it would seem that a period of about 12 years will elapse from the time the research on Vitamin 'C' was begun until its commercial production. Of this period, about 3 to 4 years could be ascribed to administrative delays. During the period 1963-64 to 1968-69, Vitamin 'C' was imported from abroad to the extent of 559.41 tonnes involving foreign exchange expenditure of Rs. 147.14 lakhs, whereas if the product had been made in the country with imported know-how, payment of royalties would not have exceeded 5 per cent of this figure.

"Another instance of this kind is the agreement made by the Bharat Electronics with the NRDC to obtain the basic know-how for the manufacture of ceramic capacitors on royalty basis from the National Physical Laboratory. In actual practice, the problems involved in the transfer of know-how to commercial production were so many that the Bharat Electronics were ultimately compelled to obtain know-how for the same purpose from abroad and only then could it produce ceramic capacitors

in 1968. Lack of detailed specifications for raw materials, absence of written details of processes and information for standardising, inadequacy of engineering data for ensuring cost control, and absence of mechanisation were some of the drawbacks which made the NPL process unworkable and uneconomic. The two cases described....illustrate the futility of redevelopment of processes that are readily available by purchase of know-how."

4.15. The C.S.I.R. is an institution meant for conducting applied industrial research. The Committee, therefore, feel that success in its work will have to be judged by the extent to which the processes developed in its laboratories find application in industry. On this criteria, it must be said that the Institution's achievements so far have been very modest.

4.16. The position in this regard would be evident from the data regarding utilisation of the results of research in the laboratories which has been furnished by the C.S.I.R. As on 1st April, 1967, 135 processes developed in the laboratories and released to various parties were in production (some of them on a token scale), as against which 95 other released processes had not gone into production, 23 of them since 1964 or even earlier years. Another 240 processes developed in the laboratories had found no takers. The position does not seem to have improved in subsequent years as would be seen from the data given in this section of the Report.

4.17. To what extent the laboratories made a dent on industrial production could be estimated from the fact that the value of the products turned out by the processes released amounted to Rs. 453 lakhs in 1966-67, as against the national industrial output of about 5,000 crores and an expenditure of Rs. 146.76 crores incurred by C.S.I.R. on its activities since the First Plan started.* These figures speak for themselves.

4.18. The fact that a large number of processes have not gone into production indicates that research efforts in the laboratories lack proper direction and are carried on without regard to the needs and requirements of industry. This is a very vital deficiency which calls for immediate correction. A closer tie-up with industry while formulating and implementing research programmes in the laboratories is very clearly indicated.

4.19. The Committee would like to mention two instances to illustrate the position regarding utilisation of processes developed in the laboratories. In one case, vitamin 'C' for the production of which a

*Supply Agenda for the 60th meeting of the Board of Scientific & Industrial Research (May, 1969—page 63).

process was worked out in the National Chemical Laboratory between 1959 and 1961, is yet to go into production, though it was licensed for production by Hindustan Antibiotics in 1965. Production is now expected to begin by 1971, but, in the meanwhile, a private company, which entered the field in 1962, with a capacity of 60 tons, is now producing 120 tons. In the other case, ceramic capacitors developed by National Physical Laboratory was taken up for production by Bharat Electronics. The process was, however, found "unworkable and uneconomic" and, therefore, the undertaking was obliged to obtain know-how from abroad for this purpose.

4.20. In view of the very poor record of utilisation of processes developed in the laboratories, the Committee would like to suggest that the Board of Scientific and Industrial Research should in future carry out as a regular feature systematic review of the performance of each of the laboratories from the point of view of their contribution to industrial production. The review should initially cover laboratories where the record of utilisation has been particularly poor: the causes for this phenomenon should be isolated and appropriate correctives applied. To facilitate a standing review, a standardised form of reporting by the laboratories should be adopted and this should provide for each laboratory reporting on the number of processes under development, the period over which development has taken place, the number developed and leased and the production established in the commercial sector on the basis of those processes and the number developed but awaiting release. The collection of data on these lines and its systematic processing would help the C.S.I.R. to understand how far research efforts in the laboratories have relevance to the needs of industry.

4.21. The Committee drew attention to the proceedings of the 17th conference of the Directors of National laboratories held in November 1967, when a view had been expressed that the NRDC, as the agency through which processes developed by CSIR were released, was not adequate for this purpose. Again in a report submitted to the Governing Body of CSIR, for the meeting held in May, 1969, the Ministry of Education had made these observations:

> "At present the National Research Development Corporation of India has been entrusted with the task of leasing out the processes developed to industry. There is considerable dissatisfaction that the present procedures are involved and take considerable time. The working of this organisation needs looking into." The Director General, CSIR stated: "Very recently, the Minister of Education has reconstituted a Board of Directors of the NRDC with a Member (Planning Commission) as Chairman. I think one of the requests I made was

for the Board of Directors to find out and to go into the questions and made recommendations in regard to the functioning of the NRDC. The reconstituted Board would now be going through the question of how these are delayed and where they are held up. In any case there are delays from the time the processes were handed over to the NRDC. The reconstituted Board is examining the whole question."

4.22. The Committee desired to be furnished with a statement showing the sources of funds of NRDC in India and how they have been employed during the last five years. The statement furnished by the Corporation indicates the sources of funds of the Corporation as (i) Share capital subscribed by the Government of India (ii) Unsecured loans from the Government of India, (iii) Share from Premia and royalties, (iv) Profits from development projects and (v) Subsidy from Government of India to cover interest paid on loans.

4.23. As regards application of funds the following position emerges from the data furnished:—

	1964-65	1965-66	1966-67	1967-68	1968-69
				(In lakhs of rupees)	
(i) Total expenditure . .	10·94	16·50	14·97	14·85	20·79
(ii) Expenditure on Development Projects . . .	5·99	1·14	1·53	1·46	0·86
(iii) Royalties paid to Laboratories	4·77	5·83	5·93	6·95	11·99
iv) Administration Expenditure	2·22	2·40	2·32	2·92	2·77

4.24. The NRDC in India was set up on the pattern of a similar Corporation established in U.K. From the Annual Reports of the NRDC in U.K., the Committee find that the NRDC in U.K. was established with a two-fold purpose—first the introduction into industry on business terms of inventions made in Government Departments and other establishments wholly or partly supported by public funds; second, the development and exploitation where the public interest so requires, of inventions from any other source which are not sufficiently developed or exploited. A significant proportion of the projects in which the Corporation invested derived from

proposals made by private inventors as would be seen from the table below:—

	1966-67	1967-68
(i) Total number of inventors communicated to the Corporation .	1899	2130
(ii) Total number communicated by private firms . . .	342	344
(iii) Total number communicated by individuals . . .	915	1059

4.25. The NRDC in U.K. undertake two type of activities: (i) Development projects, (ii) Exploitation activities. Development projects are concerned with inventions and proposals for technological innovation, where the extent of support by the Corporation ranges from assumption of all responsibility and finance involved to that of sharing it with one or more parties on a joint basis. In respect of these projects, the Corporation seeks, by the terms of the agreements it makes with those concerned, to recover its investment with interest and profit at the commercial exploitation stage; while accepting the risk that, if the project is not successful the investment may be partially or totally lost.

'Exploitation Activities' of the NRDC in U.K. cover those arrangements made by it with industry by licensing or otherwise for commercial use of inventions in the Corporation's portfolio. Here the Corporation seeks to cover its investment with interest and profit.

4.26. In a note submitted to the Committee, the NRDC have stated that the number of licences issued by them during the last 5 years were 3 to public undertakings and 269 to private industries. The representative of NRDC stated during evidence: "The response from the private sector is very good, but from the public sector it is not so good. The public sector is tied up with certain types of programmes and probably they do not have much of the other fields in which they enter, whereas the private sector can diversify and go into a number of other products." The Secretary, Department of Industrial Development stated: "By and large the field in which these researches have been conducted probably relate to mostly industries where the private sector predominates."....."The fact of the matter is that the public sector is not as diversified as the private sector. It is concentrated on basic industries."

4.27. The NRDC have also intimated that the total number of processes referred from private individuals is 26 upto 31st March, 1969 out of which one process has been licensed and is in production. No process has been referred from a private firm.

4.28. The Committee desired to know the steps proposed to be taken by NRDC to ensure that a satisfactory and productive liaison was built up with industry as its counterpart in U.K. is stated to have done. In a written reply the NRDC have stated that they are endeavouring to set up an industrial Liaison and Information Division with the following objectives which will ensure a satisfactory and productive liaison with industry:—

Industrial Liaison and Licensing:

(i) Initiate and conduct negotiations for patents/processes referred for licensing arrange meetings of industrialists, research Organisations, firms etc.

(ii) Prepare and circulate non-technical notes to industrial organisations, firms, individuals etc.

(iii) Maintain a continuing liaison and contact with research organisations and user industrial firms and to serve as a communication channel between them.

(iv) Follow-up of the processes/patents licensed to industrial firms, through correspondence and visits, study of their difficulties and rendering assistance where necessary.

(v) Follow up with concerned government departments and ministries, the cases of licences, raw materials, import of equipment etc. for the licensees of NRDC processes.

Technical Information:

(i) Maintain custody of non-technical notes, technical reports, project reports, copies of patents and processes and keep them up-to-date.

(ii) Maintain an up-to-date information suitably documented in readily available form about the position of processes/patents licensed by NRDC.

(iii) Maintain data on imports, exports, licensed capacity, production in regard to industries of direct relevance to processes/patents of interests to NRDC.

(iv) Maintain data on production, foreign exchange saving etc. on patents/processes licensed.

(v) Develop the necessary awareness and forecast technically the areas for support to research and development relevant to industrial and economic progress of the country.

(vi) To prepare abstracts and document technical information from journals, newspapers etc.

To start with a few of the officers have been appointed and appointment of others has been held up awaiting appointment of Managing Director of the Corporation. With the limited facilities with the Corporation, it takes every possible step to find out hurdles coming in the way of commercial exploitation of processes and steps are taken to encounter these hurdles. The difficulties are various in nature like registration of units, grant of industrial licences, import licences for import of capital goods and raw materials, allotment of land, procurement of scarce indigenous materials, etc. In certain cases the laboratories are requested to assist to solve the technical problems of NRDC's licensees.

4.29. The representative of the NRDC stated during evidence "Where as in U.K. the number of processes ultimately licensed is not more than 10 per cent., in India it is about 25 per cent. Out of 1,068 referred to us, 258 have been licensed, and 141 are in production. Their total value of production is more than Rs. 25 crores. It is about Rs. 5 crores during this year."

4.30. The Committee asked whether NRDC have been able to pioneer any development on a joint venture basis like its counterpart in U.K. or whether the Corporation's activities are confined only to leasing out processes developed by laboratories of CSIR. The National Research Development Corporation have intimated that their activities are not confined only to the leasing out of processes developed by National Laboratories. Since its inception it has set up about 21 developmental projects, nature of which varies from project to project. Only one specific example can be cited in the case of joint venture with industry. In this case capital expenditure was incurred by NRDC, raw materials, utilities and services were provided by M/s. Tata Oil Mills Co., Bombay, and technical guidance was provided by CFTRI, Mysore. On successful completion of project M/s. Tomco have taken over the project and agreed to reimburse to NRDC capital expenditure incurred by it.

4.31. The Committee desired to know how the terms were settled in respect of processes leased out by NRDC and how the Corporation ensures in respect of profitable lines like television etc. that Government get adequate returns having regard to the market potentialities of the product being commercially developed. The NRDC have intimated:

"The National Research Development Corporation have intimated that there is no precise criteria for settling the terms and

conditions for leasing out the processes by them since the processes fall in diverse disciplines and there are variety of factors which have to be taken into consideration while framing the terms and conditions. For example, marketability of the product, profitability, total investment etc. It is felt that it may not be possible to merge all these factors into one single lumpsum premium and royalty. The terms and conditions at the present moment are settled by the Board of Directors after inviting offers from the entrepreneurs who are requested to satisfy themselves with regard to the techno-economic potentialities of the process/product, conduct in their own way market survey and then make their offers. The entrepreneurs while sending their offers are also asked to indicate their particulars with regard to the financial position, managerial and technical skill etc. already available with them. The Board of NRDC while deciding the terms also selects the parties to be licensed keeping in view their capability to utilise the process being licensed to them. Sometime, the highest bidder may not be the best party to make the process a success. In such cases, the Board of Directors uses its own discretion in giving the process even to a party whose offer may not be the highest. In fact the terms are settled on *ad hoc* basis after receiving offers from the entrepreneurs.

4.32. The Committee asked whether the NRDC kept a check on the price of the products fixed by the licensees from time to time. The NRDC have intimated that they do not keep a check on the price of a product fixed by the licensee. The prices are fixed by the manufacturers in light of market conditions. The representative of NRDC stated during evidence "Normally, when the laboratory has completed a process, it prepares what is known as a tentative cost estimate. These cost estimates are not very accurate because it will depend on the scale of operation of the private industry or the individual. If the laboratory has done at 5 Kg. or 50 Kg. scale, and the industry wants it at one tonne capacity, the price will change. We have no control over the prices. Nothing of that kind is incorporated in the agreement." The witness added that "some six or seven years back, there was a clause that the licensee will fix the price in consultation with the NRDC. Most of the licensees at that time resented this. Ultimately this was deleted."

4.33. Asked whether any guidelines had been laid down as to how royalty should be fixed, the representative of the NRDC stated: "This matter has been before the Board of Directors a number of times and

discussed at various levels, but no rational formula has been evolved because it depends on a large number of factors like total investment, marketability, profitability, impact on the industrialisation of the country. All these cannot be compressed into one single parameter. Therefore, the Board has been taking a very lenient view as far as possible. But it is not left to any individual's discretion. It is the entire Board which takes the decision."

4.34. The NRDC in U.K. have laid stress on their publicity efforts aimed at industry so that increasing awareness can be created of the role the Corporation can play in assisting technological development. They bring out a six monthly bulletin 'Inventions for Industry' of which copies are circulated to Industry, Trade Associations and the like.

4.35. The Committee asked about the steps taken to foster interest on the part of industry in the commercial possibilities of new processes which have been developed. The representative of the NRDC stated: "The process developed is given wide publicity. Our liaison officer visits the institutes and gives all data, industrialists are called to the organisation, sometimes our officers also visit the industries and explain the significance of the research and how the process will be more useful or economical. After that offers are invited." The Committee cited the instance of television receivers developed in the CSIR laboratory at Pilani and enquired how the terms for payment of royalty were settled with the parties which had been licensed to produce these receivers. And whether, as this constituted a profitable line of production, it was ensured that Government got adequate royalty on production. In a note on this point the following position has been explained:—

"The Central Electronics Engineering Research Institute, Pilani, has developed a know-how for the indigenous manufacture of Television Receivers. Copy of the project report was circulated to about 110 parties on the 9th April, 1965 by the Institute. On 30th April, 1965, A meeting was held in CSIR to consider the licensing of the T.V. Sets. The Director CEFRI, IL&EO, an official of CSIR and the then Secretary of NRDC were present. In this meeting it was decided that one Television Receiver set would be put up in Delhi at a convenient place and the technical people from the Institute will be present for operation and explaining any technical enquiries. The entrepreneurs would be asked to see the demonstration and satisfy themselves about the technical feasibility of the invention. It was tentatively decided in this meeting that in the beginning only 2 licences should be issued. At that time, M/s. (a firm in Bombay) and M/s. (a firm in Delhi) had shown interest and were considered the best parties amongst the applicants. Subsequently, on 4th June, 1965, there

was another meeting to discuss the question of licensing of T.V. Receivers. This was attended by the then Executive Director, NRDC, Director CEFRI, IL&EO, CSIR, and a Scientist, CEFRI. By that time 12 parties had shown interest in undertaking the commercial development of the process."

"These offers were discussed at this meeting. It was felt that only promising offer was that of a party at Kanpur who had offered the following terms:—

(A) *For Exclusive Licence*	
(a) Lumpsum Premium . .	Rs. 1,50,000 in three equal instalments as under :—
	(i) Rs. 50,000 alongwith the agreement.
	(ii) Rs. 50,000 at the start of production.
	(iii) Rs. 50,000 one month after the production starts.
(b) Recurring Royalty	(i) 2% on the annual sales of first 40 lakhs rupees
	(ii) 1% on the annual sale of next one crore rupees.
	(iii) 0·25% on the annual sales beyond 1·4 crore rupees.
Period of Licence	14 years.
(B) *For Non-Exclusive Licence*	
(a) Lumpsum Premium . . .	Rs. 75,000 in three equal instalments as under :—
	(i) Rs. 25,000 alongside the agreement
	(ii) Rs. 25,000 at the start of the production
	(iii) Rs. 25,000 one month after the production starts.
(b) Recurring Royalty	(i) 2% on the annual sale of first 40 lakhs rupees.
	(ii) 1% on the annual sale of next one crore rupees.
	(iii) 0·25% on the annual sales beyond 1·4 crore rupees.

It was also decided in this meeting that the Executive Director of NRDC may negotiate with the party at Kanpur for a non-exclusive licence on the following terms:—

Lumpsum Premium	Rs. 75,000 payable in three equal instalments as under :—
	(i) Rs. 25,000 payable before execution of the agreement.

	(ii) Rs. 25,000 within 6 months thereafter.
	(iii) Rs. 25,000 on going into production or 12 months after execution of the agreement, whichever is earlier.
Recurring Royalty	Either 2 per cent
	OR
	(i) 2% on annual sale of first 50 lakhs rupees.
	(ii) 1% on annual sale exceeding Rs. 50 lakhs.

It was also decided that NRDC may approach (i) M/s..... (a firm at Bombay), (ii) M/s. ..... (another firm at Bombay) and (iii) M/s.....(the subsidiary of a foreign Company at New Delhi) who had applied for grant of Industrial licence with foreign collaboration and persuade them to enter into an agreement with NRDC for utilisation of the know-how developed by CEERI, Pilani. M/s. ..... (the subsidiary of the foreign company), by that time had not sent any offer as they had referred the matter to their Export Division at New York, USA. M/s. ..... (the first firm at Bombay) had not sent any concrete offer. They were, however, prepared to take non-exclusive licence on the terms to be negotiated with them. M/s ..... (the second firm at Bombay) had sent the offer for non-exclusive licence without any premium but on recurring royalty of 2½ per cent for 14 years. The matter was placed before the Chairman on 4th June, 1965 when he directed that the Executive Director may negotiate and get the best terms on the basis of his discussion with the parties. In pursuance of the Chairman's decision, the following terms were negotiated with the party at Kanpur:

(a) Lumpsum Premium . . .	Rs. 75,000 payable in three equal instalments as under:—
	(i) Rs. 25,000 payable before execution of the agreement.
	(ii) Rs. 25,000 payable on grant of industrial licence.
	(iii) Rs. 25,000 payable on going into production of six months after the second payment.
(b) Recurring Royalty	2% on ex-factory sale.
(c) Nature of licence	Non-Exclusive
(d) Period of licence	14 years.

(iii) In what manner the correctness of the amount of royalties received from the firms verified. Whether this is done with reference to the audited accounts of the firms or whether the CSIR have access to the original records of the firms for this purpose.

4.38. In a written reply, the CSIR have stated: "On the recommendation of the P.A.C., the Ministry of Finance (Department of Expenditure) has proposed that the Cost Accounts Officer of the Ministry may visit the concerned laboratories for the purpose.

The views of the Directors of the National Laboratories on the proposal of the Ministry of Finance were invited and the Directors have welcomed the proposal in general.

No guidelines or principles have been formulated either by the CSIR or NRDC for regulating the fixation of premia and royalties.

Patented processes/know-how are released for exploitation through NRDC. The Corporation have stated:—

"When the parties send their offer, they are supposed to fill up a proforma giving the financial position and technical competency with regard to the exploitation of the process. Bank reference is also given and the banks are asked to give confidential report about the dealings of the firm. If it is found that the financial position of the party is not sound or that the bank report is not satisfactory, the process is not leased out to the party. While deciding terms by the Board of Directors, the technical competency of the firm is given proper consideration."

The firms are asked to submit 6 monthly reports with regard to production, sales and the sale value of their products manufactured in accordance with the processes licensed to them. Audited reports are also insisted. Sometime when the audited report is not available, the firms are asked to send provisional statements. NRDC has got a clause in agreement which it executes with the firms, that NRDC can check up their accounts for the purpose of calculation of royalty in the manner prescribed in the licence agreement at any convenient time. If need arises, these accounts are checked up by NRDC to derive the correctness of the royalty figures given by the firms."

4.39. In the Committee's view, one reason for the unsatisfactory utilisation of processes developed in the C.S.I.R. laboratories is the inadequacy of the National Research Development Corporation, the agency through which the processes are released. At the last meeting of the governing body, the Vice-President of C.S.I.R. expressed the view that "there is considerable dissatisfaction" that the present procedures for release of processes "are involved and take considerable time" and that "the working of this organisation needs looking into."

4.40. The data given in this section of the Report would show that the activities of the Corporation have been on a very modest scale. The Corporation was patterned on the lines of a similar organisation set up in U.K. whereas its counterpart in U.K. sponsored a number of developmental projects in collaboration with industry and has been functioning as a channel for development of a significant number of inventions emanating from the commercial sector, the Corporation in India has not been able to build up a very satisfactory liaison with industry in the country so far. Upto 31st March, 1969, the total number of processes referred to the Corporation from private individuals was 26 out of which only one process has been licensed and is in production. As for developmental projects, the Corporation has since its inception sponsored 21 schemes of which only one was a joint venture with industry. It is obvious that the Corporation has yet to forge organic links with industry, without which it is not likely to have any great degree of success even in its efforts to get entrepreneurs to take up processes developed to the laboratories. The Committee note that the Board of the Corporation has been reconstituted and that steps are being taken to streamline the arrangements for industrial liaison. They hope that this would bring about an improvement in the performance of the organisation.

4.41. The Committee would also like the Corporation to evolve some rational criteria for fixation of royalties on processes released to industries. In a very profitable line of production like Television receivers, for instance, the recurring royalty has been just 2 per cent of ex-factory sales. This return must be considered meagre when it is weighed against royalty rate of 5 per cent to 10 per cent allowed to foreign parties from whom know-how is generally acquired in the country on collaboration basis. The matter, in the Committee's opinion, needs re-examination.

4.42. Elsewhere in this Report, the Committee have drawn attention to the lack of cost consciousness in the C.S.I.R. laboratories which undertake pilot projects. The Committee have in paragraph 1.7 of their Seventy-Fifth Report (Fourth Lok Sabha) stressed the need for introduction of a general pattern of cost analyisis in the laboratories with a view

4.49. The Committee desired to know the progress made by the CSIR in identifying laboratories which can be run in collaboration with industry and research associations. In a written reply the CSIR have stated as follows:—

"The CSIR has been actively promoting the formation of research associations by industry. It not only undertakes the educational task of propagating the importance of research by industry for industry, but also assists industries desirous of forming research associations by way of technical advice, preparing plans and procuring materials."

"At present, the following 10 Industrial Research Associations: 4 for textiles and one each for cement, plywood, tea, jute, wool and automobiles are functioning:—

1. Ahmedabad Textile Industry's Research Association, Ahmedabad.
2. Bombay Textile Research Association, Bombay.
3. South India Textile Research Association, Coimbatore.
4. Silk and Art Silk Mills' Research Association, Bombay.
5. Indian Plywood Industries Research Association.
6. Wool Research Association, Bombay.
7. Tea Research Association, Calcutta.
8. Indian Jute Industries' Research Association, Calcutta.
9. Cement Research Institute of India, New Delhi.
10. Automotive Research Association of India, Bombay.

"Two more Research Associations, Indian Rubber Manufacturers Research Association, Bombay and Indian Paint Research Association, Calcutta have been recognised for financial assistance, in principle, by the Governing Body of the CSIR at its meeting held on 14th May, 1969.

The formation of associations of Electronics Industry, Chemical Industry, Pharmaceuticals and Drugs, Instruments, Non-ferrous metals and Printing industries is under consideration.

On the question of converting the Central Glass and Ceramic Research Institute into a research association laboratory, the DGSIR had a discussion with the Glass Industry and the Pottery Industry. The matter is under consideration as to how their contribution could be collected.

As regards the Central Leather Research Institute, the leather industry of being wide-spread character, there are some inherent difficulties."

"*Meeting with specific industries*:—During the past two years DGSIR has been holding a series of meetings with various industries to encourage user participation in the research activities of the National Laboratories/ Institutes. Meetings with the following industries have already been held:—

Chemical Industry;
Electronics Industry;
Instruments Industry;
Non-ferrous Metals Industry;
Man-made fibre Industry.

Similar meetings with refrigeration industry, printing industry, etc. are proposed to be held in the near future. In addition to these meetings, Get-together on specific items/areas are also convened by the National Laboratories/Institutes from time to time."

"*Sponsored Research*:—In order to create deeper impact of the work of the Laboratories on the economy, the laboratories are encouraged:—

(i) to accept sponsored projects from industry;

(ii) to tackle specific problems received from individual firms on payment;

(iii) to act as consultants to industry and charge for the services rendered."

"In pursuance of the above policy, guidelines for acceptance of sponsored research schemes by the National Laboratories/Institutes have formulated and circulated to the National Laboratories/Institutes. According to guidelines:—

(a) Projects involving a total expenditure of not more than Rs. 10,000 may be approved by the Head of Laboratory/ Institute.

(b) For projects involving an expenditure of between Rs. 10,000 and Rs. 50,000 prior approval of the Executive Council be taken wherever possible. In case of urgency, the Head of the Laboratory/Institute may accord approved and report the matter to the Executive Council at its next meeting for ratification.

(c) For projects involving an expenditure of more than Rs. 50,000 prior approval of the Executive Council shall be taken."

4.50. The Committee are of the view that applied industrial research can thrive and its results put to fruitful use only if the industry has a stake in the research work. From this point of view it is essential that research ventures should be organised in collaboration with industry. The data available suggests that in U.K. in pursuance of the deliberate policy of Government the number of cooperative research associations has increased. From 20 such associations in 1939, the number increased to 50 by 1960. A start in this regard has been made in India with the organisation of a number of cooperative Research Associations, in league with industry. The pace should be accelerated.

V

PILOT PLANTS

5.1. During evidence, the Director General, C.S.I.R. informed the Committee that "there are, if I am not mistaken, over 100 pilot plants in the national laboratories and a total expenditure of about Rs. 9.5 crores has been incurred. Most of these pilot plants test the work which is already done on the laboratory scale. If any of the results of the laboratory scale hold a promise, they are tested on a pilot plant scale. Some of the pilot plants have been continuing for quite some period. Only recently the Governing Body of the CSIR appointed a Committee headed by Dr. Kane to look into the question of these pilot plants in the national laboratories. The Committee has submitted an interim report. They are now going to the various laboratories where these are pilot plants to investigate the plants in detail. The interim report is mostly based on the information which the Committee received in reply to the questionnaire they had issued. The increases over the original estimates may be due to some of the equipment being obtained from abroad and the increase in price due to devaluation and things of that kind."

5.2. The Committee desired to be furnished with a statement showing the year-wise break-up of expenditure (capital and revenue) on the pilot plants at present in operation in the various laboratories, particulars of the pilot plants which are more than five year old and capital and maintenance expenditure incurred on them, their significance in the national economy, the probable date of completion of work, approximate expenditure needed to complete the work, the extent of delay, if any, and reasons therefor and to what extent the estimates have gone up and whether it is necessary to continue them. The C.S.I.R. have furnished statements showing the details of pilot plants and expenditure incurred on them in respect of certain laboratories. But these are, however, incomplete. The Committee have been furnished a copy of the Report of the Kane Committee from which the following picture regarding pilot plants in the C.S.I.R. laboratories emerges:

(a) *Expenditure on Pilot Projects*

"An examination of the data showed that by 1968 there were over 155 Pilot Plants in existence or under construction in CSIR Laboratories."

"The total expenditure under the expenditure head Pilot Plants was Rs. 9.59 crores. The data also show that about 70 per cent of this expenditure was incurred by the following five National Laboratories:

(Rs. in crores)

i) National Metallugical Laboratory, Jamshedpur	2·095
(ii) Central Fuel Research Institute, Jealgora	1·723
(iii) Regional Research Laboratory, Hyderabad	1·226
(iv) National Physical Laboratory, New Delhi	1·183
(v) National Chemical Laboratory, Poona	0·614
TOTAL .	6·841"

(b) *Utilisation of the Plants*

"Industrial exploitation of the products and processes developed by National Laboratories has been small in relation to the expenditure and effort involved in the Pilot Plant work. The information made available indicated that the revenue earned by National Laboratories from Pilot Plant Projects so far have been disproportionately small."

(c) *Selection of Projects*

"In a majority of cases, Pilot Plants were not sponsored and consequently CSIR funds were used for their installation and running....In its discussions with the Directors and staff of the Laboratories, the Committee found that most of the problems for Pilot Plant work were chosen by Scientists working in the Laboratories/Institutes on their own appreciation of the developmental needs of industry. Public or private sector industries had usually no part either in suggesting problems for investigations, or for their techno-economic-evaluation. In most cases, the ultimate user of the results of major Pilot Plant investigations, was not identified before undertaking the project. Consequently, it was not possible to obtain technical and financial participation in the investigations by an ultimate user, be it a Department of Government, or a public or private sector undertaking. Therefore, in many cases, the entire financial burden of setting up and operating Pilot Plants was borne by the CSIR. It is thus not surprising that the search for a sponsor that began after the investigations were completed, and after most of the scientists working on them were dispersed, rarely succeeded."

(d) *Processes explored*

"With a few exceptions, the processes for which Pilot Plants were built were already well-known elsewhere, sometimes within the country itself; most Pilot Plants thus appeared to be attempts at rediscovery. Examples of such projects are:—

(a) Caffeine from tea waste (RRL, Jorhat).

(b) Vanadium pentoxide catalyst (NCL).

(c) Deinking of newsprint (RRL, Jorhat).

(d) Phthalates and other plasticizers (NCL).

(e) Phthalic anhydride—sponsored by NRDC (250 kg./day) (CFRI).

(f) Synthetic cryolite (50 kg./day) (NML).

(g) Hand made paper (0.5 ton/day) (RRL, Jorhat).

(h) Oilseeds milling (20 tonnes/day) (RRL, Hyderabad)."

[NOTE:—The expenditure incurred on plant at (f) above was Rs. 2·89 lakhs and (h) Rs. 2·03 lakhs. Data in regard to the expenditure on six projects not available in the documents furnished by CSIR].

(e) *Implemenation of Pilot Projects*

"In general, the actual expenditure on a Pilot Plant was substantially greater than originally contemplated the most conspicuous cases being the coal gasification plant at RRL, Hyderabad, where the estimated cost increased from the original estimate of Rs. 21 lakhs in 1962 to Rs. 1·89 crores, out of which Rs. 0·73 crores has already been committed. The other similar case is the magnesium project at NML, where against the initial estimate of Rs. 55·73 lakhs, the project will now cost Rs. 127·850 lakhs or Rs. 1·28 crores, approximately."

"An investigation for the production of cryolite continued in a Pilot Plant at the NML even when a commercial plant based on imported know-how had gone into production. Similarly, Pilot Plant work on vanadium pentoxide catalyst continued at the NCL after the project for local manufacture of catalyst based on overseas collaboration commenced production adequate to make the country self-sufficient in respect of vanadium pentoxide catalyst.

"The above examples have led the Committee to the view that there is a general lack of awareness among those responsible for suggesting and approving research projects that such projects could be evaluated by a cost-benefit analysis."

(g) *Processes to be explored.*

"The Committee feels that a decision to set up a Pilot Plant should be taken only under the following circumstances:

(i) The product is new and the data from laboratory experiments are not adequate for scale-up.

(ii) The suggested process/equipment is claimed to be superior to existing methods of making a product, but the data for scale-up are not available.

(iii) The product/process is well-known, but the know-how is held secret by a few firms. Efforts to obtain know-how have not been successful."

"The Committee strongly recommends that every proposal for a Pilot Plant project should be subjected to the scrutiny of a Screening Committee and/or an Appraisal Committee appointed by the C.S.I.R."

"The Committee recommends that all projects, without exception, must find a sponsor if a Pilot Plant is to be built. The sponsor could be a private sector undertaking, a department of Government, a public sector undertaking, a State-run-industry or the Defence Services. If the project is important enough to the national economy, the CSIR itself (but not the Laboratory) may decide to sponsor it. If the rules against licensing and in particular about exclusive licensing act as a deterrent to industry to sponsor projects, then they should be modified."

"....barring a few exceptions, entrepreneurs complained generally about inadequacy of the know-how and insufficient appreciation by the Laboratories of any further work that may be necessary before the know-how could be commercialised. They also complained of lack of assistance regarding specifications for purchase of raw materials as well as about engineering aspects in scaling-up the projects, and absence of continued assistance for trouble-shooting and development. This reaction perhaps explains the hesitation felt by entrepreneurs in investing funds on more ambitious schemes proposed by the Laboratories. However, the Committee noted that the NCL have now arranged with Project Engineering Companies to provide performance guarantees for processes developed in the NCL. This view is now finding favour with other Laboratories."

5.3. The Committee referred to the proceedings of the 60th meeting of the Board of Scientific and Industrial Research in which a reference had been made to a working group appointed by CSIR to finalise Fourth Plan Proposals. That team had recommended (in December, 1968) that about 21 of the continuing projects in various laboratories should be discontinued. The Committee desired to know about the expenditure

incurred by CSIR on these projects and how many of them had been discontinued. In a written reply, the CSIR stated as follows:—

"The Technical Committee of the B.S.I.R. at its meeting held on 11th May, 1969 considered the recommendations of the Working Group appointed to scrutinise the 4th Plan proposals of the CSIR and recommended as follows:—

> 'The Committee felt that this will need some detailed examination of the programmes of all the National Laboratories/Institutes for which the Committee may have to sit for one or two days. It was agreed that a meeting should be held as soon as possible to look into the Fourth Plan in some detail'.

5.4. The B.S.I.R. at its meeting held on 12th May, 1969 endorsed the following views of the Vice-President, CSIR on the 4th Plan proposals:—

> 'In regard to the Fourth Plan, he felt that more detailed work was needed. He had gone through the recommendations of the various Working Groups and Sub-groups. He noticed that the Technical Committee had also decided to have more detailed discussion in a special meeting. He said that he had also some ideas in regard to the Plan. He suggested that the present meeting of the B.S.I.R. may not consider the Fourth Plan and a special meeting of the Board may be convened to discuss only the Plan. He hoped that by that time, he would have had occasions to discuss with more people about the working of the C.S.I.R. and the National Laboratories and more concrete ideas may emerge. He suggested that a special meeting of the Board may be held in November or December, this year to consider and finalise the Fourth Plan proposals for the C.S.I.R. after he had completed his discussions. This was endorsed by the President'.

"In the meanwhile, the proceedings of the B.S.I.R. along with the recommendations of the Working Group have been brought to the notice of all the National Laboratories/Institutes. After finalisation of the Fourth Plan proposals, the Laboratories/Institutes concerned would be advised to discontinue the projects recommended by the Working Group and various Sub-groups."

5.5. In the Committee's opinion, the performance of 'pilot plants' set up in the C.S.I.R. laboratories has been most unimpressive. By 1968 there were over 155 such pilot plants in existence or under construction and the investment in them amounted to over Rs. 9.6 crores. A Committee set up by the C.S.I.R. (Kane Committee), which reviewed the

working of these plants found that very "few of the processes" developed through pilot plants had been commercially exploited and that the revenues earned by the laboratories "have been disproportionately small" in relation to the expenditure and effort that went into these ventures.

5.6. The data given to the Committee shows that over 70 per cent of the expenditure on pilot plants was incurred by five laboratories. Two of these laboratories, the Regional Research Laboratory, Hyderabad and the National Metallurgical Laboratory, Jamshedpur, alone spent over Rs. 2 crores on two pilot plants—one on a coal gasification project and the other on a low-shaft furnace plant. In the first case, the gas produced has not found any use nor its quality been tested, while in the other, as reported by the Kane Committee, "not a single low shaft furnace has been established in the country for production of pig iron with know-how obtained from this plant." It is interesting to note that these pilot plants have been in existence for eight to ten years.

5.7. A working Group appointed by the C.S.I.R. to finalise the Fourth Plan proposals found that 21 projects in the laboratories were serving no useful purpose and suggested that they should be discontinued. The investment in these projects has not been intimated to the Committee by the C.S.I.R., which incidentally is yet to take a final decision on these projects (though the Working Group reported as early as December, 1968). This, in the Committee's view, suggests that projects which involve substantial investments are not being processed with due care.

5.8. Yet another aspect of these pilot plants is the fact that some of them were what the Kane Committee characterised as "attempts at rediscovery" of "processes already well known elsewhere, sometimes within the country itself". That Committee gave at least six instances of such pilot plants. The investment in two of these amounted to Rs. 4.90 lakhs; data in regard to others has not been furnished.

5.9. The data furnished to the Committee also shows that the pilot plants in some cases continued even after indigenous production in the commercial sector had been established on the basis of know-how obtained from elsewhere. The Kane Committee cited two such cases—one involving production of cryolite in the National Metallurgical Laboratory and the other relating to vanadium pentoxide catalyst at the National Chemical Laboratory. The Committee are left with the impression that the laboratories concerned showed no appreciation of the developmental needs of the industry for whose benefit the pilot projects were meant.

5.10. By far the greatest drawback, in the Committee's opinion, about the pilot projects in the laboratories is that they were initiated without enlisting the participation of the industry. As these plants were meant

to demonstrate the commercial feasibility of processes, the entrepreneur interested in its development should have been located and his identification with the project secured. Instead, as pointed out by the Kane Committee, "the search for the sponsor began after the investigations were completed and rarely succeeded." The Committee consider it extraordinary that an institution like the C.S.I.R., whose job is to encourage application-oriented research should have proceeded about its projects in this fashion. The Committee feel that the C.S.I.R. should now take stock of the position in regard to pilot plants and tighten the procedures for the clearance and establishment of these projects. This should be secured by the following steps :

(i) All proposals for establishment of pilot plants should receive the most searching scrutiny. Approval should be given only if the product or the process involved is new or the know-how involved is a secret held by a few firms which it would be worthwhile to disseminate.

(ii) No proposal should be ordinarily approved without a sponsor from industry or Government and to encourage investment by the concerned interests, the laboratories should consider giving performance guarantees, as is reported to be done by the National Chemical Laboratory.

(iii) A pilot plant should not be allowed to drag on indefinitely, as its very purpose, i.e., the demonstration of the viability of a process would be defeated thereby. The C.S.I.R. should, therefore, prescribe an outside time-limit for the completion of these projects.

(iv) The findings in a later section of the Report would show that some laboratories have showed very little cost-consciousness while implementing pilot plants. Pilot plants under such circumstances become a self-defeating exercise. The estimates for these projects should be most carefully drawn up and costs strictly controlled.

(v) The C.S.I.R. should set up immediately competent appraisal teams as suggested by the Kane Committee to review the existing plants. This should be done within a prescribed time-limit and projects not found to be useful should be scrapped, so that further time and money are not expended on them.

5.11. The Committee drew attention to the First Report of the Committee set up by the C.S.I.R. to consider the Fourth Plan Proposals expressing concern about the following two pilot projects in particular and desired to know the present position:

(i) a vertical kiln plant set up in the Regional Research Laboratory, Jorhat, contrary to a decision taken by the Governing

5.16. The Committee disapprove of the fact that the Regional Research Laboratory, Jorhat proceeded with the setting up of a vertical kiln plant contrary to a decision of the governing body of C.S.I.R. that the feasibility of the project should be investigated first. The Committee would like to be apprised of the explanation of the laboratory for this extraordinary course of action and the steps being taken by C.S.I.R. to ensure that cases of this type do not recur. It should also be examined how the laboratory found funds for this project, when it had not been approved by C.S.I.R.

5.17. The magnesium plant at the National Metallurgical Laboratory, Jamshedpur is an instance of a pilot plant undertaken in haste, without adequate investigation into its cost aspects. In the result, the project which was initially estimated to cost Rs. 57.73 lakhs will now cost Rs. 1.27 crores. The Committee feel that laboratories doing applied work should show a better sense of awareness of the cost of their work vis-a-vis **expected benefits. The Committee have made some suggestions on this point elsewhere in this Report.**

Coal Gasification Plant at Hyderabad

Audit Paragraph

5.18. In November, 1962 the Council approved establishment of a coal gasification pilot plant (estimated cost Rs. 21 lakhs) at the Regional Research Laboratory, Hyderabad. Due to general rise in the cost of equipment and labour, inclusion of certain additional units and changes in the location to the plant the estimate was revised to Rs. 45.50 lakhs in September, 1964. Again in October/November, 1966 the Laboratory proposed further revision of the cost to Rs. 107 lakhs (non-recurring) and Rs. 82.20 lakhs (recurring for six years), the additional expenditure being due to devaluation of the rupee, interest on deferred payments, rise in prices and inclusion of certain other items which had not been included earlier.

5.19. In 1966 before getting the revised estimate approved by the Governing Body of the Council, the Laboratory placed orders for purchase of equipment on certain foreign firms. Upto February, 1969 the expenditure on purchase equipment machinery land etc., was about Rs. 72 lakhs*.

5.20. In July, 1967 the Council had appointed an expert committee to examine the project *de novo* in the light of the revised estimate framed by the Laboratory in October/November, 1966. According to the report (submitted in January, 1968) of that Committee:—

(i) No preliminary experimental work "which is considered necessary for establishment of a pilot plant, particularly the one involving considerable expenditure", appeared to have been done by the Laboratory before getting the scheme approved by the Council. Further, "it has never been clear whether

*Cost of land (about Rs. 20,000) is yet to be paid to the Andhra Pradesh Government (December, 1968).

the plant was to be established to produce synthesis gas for production of ammonia or industrial or domestic gas to be supplied to the city of Hyderabad."

(ii) An identical plant had been functioning in the Central Fuel Research Institute, Dhanbad, but this was not kept in view while pursuing the proposal for another plant in Hyderabad.

(iii) The project would result in operating loss of Rs. 48.2 lakhs (exclusive of depreciation on equipment and interest on capital invested) during the six year period commencing from 1967-68. "The constant loss is not justified, particularly when such loss has to be borne by CSIR without any guarantee that at the end of six-year period there will be some entrepreneur who will be interested in taking over the plant for commercial operation."

5.21. The Committee, therefore, felt that order for equipment and machinery, which had not yet been delivered to the Laboratory, might be cancelled and such of the equipment as had already been delivered be disposed of; and that, in case this cancellation was not possible, steps should be taken to transfer the plant to some fertilizer producing factory in the public or private sector. If neither of these courses was feasible, the Committee recommended, the plant should be erected in the Laboratory for operating as a testing unit for development work for gasification of coal. Implementation of the committee's recommendations is still awaited (January, 1969).

5.22. Apparently, the project was not properly conceived or planned and the expenditure of about Rs. 72 lakhs was avoidable.

[Paragraph 116 of Audit Report].

5.23. The Committee envisaged about the objectives of the project as originally envisaged. In a written reply, the CSIR have stated as follows:

"In the Agenda Note that was placed before the BSIR and the Governing Body of the C.S.I.R. at their meeting held on 2nd and 3rd November, 1962, the aim of the project was stated as :

"to study the technical possibilities and economics of complete gasification of low grade coals particularly all the non-coking types having high ash content. It is also aimed to obtain data on optimum conditions of operation and design of gasification plants."

"It was also proposed to install a continuously operating pilot plant with a capacity of 30,000 normal cubic meter/day of synthesis gas or equivalent fuel gas at the Regional Research Laboratory Hyderabad."

"At a later stage, the Regional Research Laboratory, Hyderabad while asking for the revised sanction of Rs. 45.50 lakhs on 28th December, 1963 included certain items of equipment e.g. CO Conversion Plant, Hot Potash Wash Plant and Final H_2S Removal Plant which were not included in the original proposal" of the laboratory to convert the industrial gas into town gas.

"In October 1966, the Regional Research Laboratory, Hyderabad again asked for additional funds under Capital and Recurring (for the running expenses of the plant for six years). The Nargundkar Committee which was set up by the Executive Council of the Laboratory to examine the proposal estimated the expenditure as follows:

Capital	Rs. 107.00 lakhs
Recurring	Rs. 82.20 lakhs

In the above revised estimates the CO conversion plant was not included."

"The objectives of setting up the Coal Gasification Plant at the Regional Research Laboratory, Hyderabad, as clarified by tne Director, Regional Research Laboratory, Hyderabad (who was also a Member of the Committee) before the Kane Committee were:

(1) to gather technical information on the quality and yield of gas from various Andhra Pradesh coals;

(2) to improve and modify the pressure gasification process to work on a slagging bed; and

(3) at a later stage to convert the raw gas (i) into synthesis gas; (ii) into town gas; and to carry out a trial distribution of town gas on a semi-commercial scale."

"The Kane Committee in its Report has stated that it has never been clear whether the Plant was to be established to produce synthesis gas for production of ammonia, or industrial and domestic gas to be supplied to the city of Hyderabad. If the

synthesis gas was the objective then a CO Conversion Unit would be an inevitable component. If the gas was intended to be used as industrial or town gas then a provision of a single gasifying unit would not be adequate to guarantee continuity of supply to consumers, without stoppage due to breakdowns and maintenance of plant. If it was intended to distribute the gas as town gas, both the sites are far from the heavily populated areas of Secunderabad or Hyderabad."

5.24. Referring to the aim of the project, the Committee asked whether it justified a pilot plant on a commercial scale capable of producing 30,000 cubic metres of gas per day and whether the laboratory should not have gone in for a smaller plant on laboratory scale. The Committee also desired to know why the estimates were revised upwards by including items which had relevance only to a project for production of industrial gas or town gas. In a written reply, the C.S.I.R. have stated that:

"The Director, Regional Research Laboratory, Hyderabad has stated that the Laboratory wanted to develop the necessary technology for conversion of low grade coals into industrial gas which could later be converted into town gas or synthesis gas. Instead of choosing the step of developing a gasification process *de novo* and proving it on a small plant and taking it on to an intermediate scale pilot plant, the other alternative of buying an intermediate scale plant based on the best know-how available erecting and operating it and subsequently effecting improvements and modifying it to suit to local conditions was chosen. It was considered desirable to erect a pilot plant which will give about 1000 cubic metres of gas per hour."

5.25. The Committee drew attention to the observations of the Expert Committeee that no preliminary experimental work which is considered necessary for establishment of pilot plant, particularly one involving considerable expenditure appeared to have been done by the laboratory. The Director, R.R.L., Hyderabad stated: "I can only say that I differ from this statement. Preliminary work was done and was published in scientific journals. The work was evaluated by the Executive Council of the Laboratory. Before sanctioning it the Executive Committee had recommended that in view of the successful experiments already carried out by the laboratory, we should go ahead with this."

5.26. The Committee desired to know whether any effort was made to ensure participation in the project by coal industries. In a written reply, the CSIR have quoted the following observations of the Expert Committee (Kane Committee):

"As the Pilot Plant is only a preliminary to the establishment of a commercial plant, it is desirable not only to identify the

organisation which will ultimately use the results of the pilot plant work, but it is preferable that such an organisation should be associated, financially as well as otherwise, with the establishment of a pilot plant. None of these criteria seem to have been satisfied in the present case. The equipment proposed to be ordered represents a semi-commercial scale unit of a type which has been developed sucessfully for commercial operation by Messrs. Lurgi. There is no association in the project either of a coal mining company which might be interested in the gasification process for increasing its sales of low grade coal, or of a town gas or a fertilizer manufacturing company who might be the ultimate consumers of such gas."

"The Director, Regional Research Laboratory Hyderabad has, however, stated that besides developing a coal-based technology for production of gas required in the manufacture of fertilisers and town gas, the proposed pilot plant would have helped the collieries to find alternate markets for the coal mined by them. The Committee appointed by the Executive Council of the laboratory in October, 1956 with Shri S. K. Nargundkar (who was then the Managing Director of the Singareni Collieries Co. Ltd.) as Chairman examined the possibility of locating the unit at Ramagundam so that the collieries could give some facilities. But this was given up as the running costs were estimated to be more than those for operation at Hyderabad."

"The Singareni Collieries Co Ltd., the former Government of Hyderabad, that is, the present Government of Andhra Pradesh have expressed their inability to participate in this project financially.

5.27. The Committee asked whether CSIR took into account the fact that a similar plant had been commissioned successfully at Dhanbad while approving the Hyderabad project at various stages—1962 and 1964. In a written reply, the C.S.I.R. have stated :

"The objectives of the plant installed at the Central Fuel Research Institute, Jalagora were:—

(i) To test performance of all Indian coals, including lignites and lignite briquettes by the Lurgi Pressure Gasification Process for production of: (a) towngas; (b) synthesis gas, including synthesis gas for production of ammonia, methanol and of oil and other hydrocarbons based on coal-gasification;

(ii) To prepare specifically 300 M/hour of CO_2 free gas suitable for synthesis reactions such as Fischer—Tropsch synthesis for other pilot plant work at C.F.R.I.;

(iii) To provide heating gas required for other large pilot plant in the Institute;

(iv) To supply high pressure steam for other pilot plants in the institute from the high pressure boiler of the unit;

(v) To supply oxygen to other oxygen gasification, *e.g.*, powder coal gasification plant;

(vi) To produce pure hydrogen for hydrogenation service for tar and coal hydrogenation plants;

(vii) To generate producer gas under pressure for certain experiments;

(viii) To study possibilities of integration of the process with the Durgapur-Calcutta Gas Supply Project, a Project which was also sponsored by CFRI;

(ix) To study performances of catalysts for desulphurisation, shift reaction and other purposes."

"There was no mention/reference of the existence of the gasification plant at Central Fuel Research Institute, Jealgora in the Agenda Notes which were placed before the Board of Scientific and Industrial Research and the Governing Body of the CSIR at their meetings held on 2nd November, 1962 and 3rd November, 1962 respectively and Finance Sub-Committee at its meeting held on 26th September, 1964. That a similar plant was set up at Central Fuel Research Institute was mentioned before the revised estimates of Rs. 45.50 lakhs for Coal Gasification Plant at the Regional Research Laboratory, Hyderabad were sanctioned in September, 1964."

"It was considered that the Regional Research Laboratory, Hyderabad, would work on the types of coals available in Andhra Pradesh area. The coals on which the Central Fuel Research Institute is working and the coals on which the Regional Research Laboratory, Hyderabad would work are different. The Andhra Pradesh coals are high ash non-coking coal."

5.28. During evidence, the D.G., S.I.R. stated: "I am told it was mentioned at the meetings of the Governing Body that there is such a plant but there is no record anywhere." Asked whether this was brought to the notice of the Expert Committee, witness stated: "It might have been mentioned, I cannot say." The Director, R.R.L., Hyderabad who was a member of the Expert Committee (Kane Committee) stated: "I raised this point in the Committee. In the minutes of the governing body only the

decisions are recorded. I requested Dr. Kane to request the secretariat to produce a verbatim report of discussion." The witness added: "Even the Finance Ministry, while sanctioning the foreign exchange in the French agreement case, raised this question on our files saying 'would it not be advisable to cancel this plant or since only the oxygen plant has been obtained before and it was a saleable commodity, could it not have been sold?' and so on. Even at that stage, when only Rs. 13 lakhs had been invested we could have been asked to sell the oxygen plant and not to go ahead with it. The reasons explained by the C.S.I.R., which were taken to be valid reasons even by Finance Ministry, and so the sanction of 23 lakhs French francs under the credit was given with the express knowledge, both in the governing body and in the Government circles that such a plant existed in the C.F.R.I."

5.29. The representative of the Ministry of Finance stated that "In May, 1964 when the cost of the plant was proposed to be raised to Rs. 45 lakhs, the C.S.I.R. informed the Ministry of Finance as follows:—

> "It is true that the Central Fuel Research Institute is also working on the gasification of coal but it has been agreed that the Regional Research Laboratory, Hyderabad will work on the types of coal available in the Andhra Pradesh area. The coals on which Central Fuel Research Institute is working and the coal on which RRL, Hyderabad is working are different. Andhra Pradesh coals are high ash non-coking coal. The CFRI pilot plant which is referred to in the last para of the F.A.'s note relates to gasification in a slagging gas generator which is still under consideration. The one which is now proposed to be established at RRL, Hyderabad, is an entirely different process, complete gasification of high ash non-coking coal of the Andhra Pradesh area. Governing Body of the CSIR has already sanctioned the project. The proposal now related to increase in the cost for various reasons which are mentioned in the papers."

5.30. The Committee asked if the CSIR had investigated whether the plant at Central Fuel Research Institute could be utilised for experimentation on Singareni Coals. In a written reply the CSIR have stated: "The present plant at CFRI can be utilised for the purpose. CFRI has stated that, in fact, a contract for gasification of Singareni coals for production of liquid hydrocarbons is under correspondence with the Singareni Colliery authorities. Earlier, tests were carried out with Singareni coals at the CFRI Pilot Plant as a part of survey being carried out on characteristics of gasification of coals from Orissa, Andhra Pradesh and Madhya Pradesh coalfields."

5.31. In their reply to CSIR, the Central Fuel Research Institute have stated, "It is not known to us whether the CSIR took into account the fact that a similar plan had commissioned successfully at Dhanbad while approving the Hyderabad Project. However, from a statement made in the proposal for setting up the Hyderabad project, an impression was gained that no work had been done in India on gasification of coal, though in a letter dated 27th February, 1964, there was at least an indication of the knowledge of the CSIR authorities that a plant had been installed at CFRI".

"The facts are that the TCM grants were made for installation of the gasification plant at CFRI in 1956-57; the delivery of the plant was received in 1959-60; erection of the plant was completed in early 1962. However, there were difficulties in commissioning the plant till late 1963 and, finally, the plant was inaugurated in early 1964.

"This Institute is not aware of the original purpose of RRL, Hyderabad, purchasing the plant. If information on any particular coal and its gasification characteristics were required, it could be easily obtained by subjecting such coals to tests in CFRI pilot plant. If on the other hand, the RRL plant was meant for making commercial supplies of gas to Hyderabad town or to some other industry, then a plant of the type set up at CFRI, or its copy at RRL, Hyderabad, is not suitable. These are pilot plants and not designed for commercial operation on a continuous basis.

"The present plant at CFRI is meant for experimentation and can always be utilised for the purpose. In fact, a contract for gasification of Singareni coals for production of liquid hydrocarbons is under correspondence with the Singareni Colliery authorities. Earlier, tests were carried out with Singareni coals at the CFRI pilot plant as a part of the survey being carried out on characteristics of gasification of coals from Orissa, Andhra Pradesh and Madhya Pradesh coalfields."

5.32. The Committee desired to know the reasons of increase of estimates of the projects from Rs. 21 lakhs in 1962 to Rs. 107 lakhs. The Director, RRL, Hyderabad stated during evidence that the sanction of Rs. 21 lakhs in Governing Body in November, 1962 was based on preliminary *proforma* estimates which had been framed by the Laboratory probably sometime starting in 1956. In 1963, 18 firms in Europe were addressed by the Regional Research Laboratory, Hyderabad to obtain quotations for the equipment needed for the project. On the basis of these quotations, the CSIR were requested for a revised sanction of Rs. 45·5 lakhs and the Governing Body sanctioned the amount in September, 1964. As against requirement of Rs. 35 lakhs in foreign exchange,

only foreign exchange of Rs. 11 lakhs was released after a passage of nearly one year. It was, therefore, requested to the CSIR that order might be split into three instalments according to the release of foreign exchange. The sanction of the Vice-President of the CSIR was conveyed to the laboratory in March, 1965. The CSIR then explored the possibility of getting foreign exchange under one of the aid programmes oecause free foreign exchange was not available. It could not be accounted under German aid and it was finally possible to accommodate it under the French Aid. Foreign exchange of about 23 lakhs French francs was released. The plant had to be ordered from France resulting in a price rise of about 10 per cent on account of difference in German and French prices. But before the order was placed, the rupee was devalued in June, 1966. The delay in placing the order and release of foreign exchange caused a price rise of Rs. 10·2 lakhs. The devaluation of rupee, interest on deferred payment resulted in rise of Rs. 30·5 lakhs. These were the major factors which themselves accounted for a price rise of Rs. 41 lakhs. The witness added that at the first meeting of the executive council of the Laboratory held after devaluation on the 15th October, 1966. the matter was placed before them that it was likely that the plant might cost Rs. 107 lakhs. The executive council appointed an expert committee (Nargundkar Committee) to go into the matter. The Committee examined the whole estimates and recommended that despite the estimated price rise due to devaluation and other factors, it was worthwhile to go in for this plant. In a written reply C.S.I.R. have stated. "The Governing Body has not approved of the increased estimates of Rs. 1·89 crores (Rs. 107 lakhs non-recurring plus Rs. 82 lakhs recurring) for the Coal Gasification Plant arrived at by the Nargundkar Committee in October, 1966, but recommended at its meeting held on 15th July, 1967 that a Committee of Experts should be appointed to scrutinise the technical and economic aspects of the project and the estimates. Accordingly, an Expert Committee under the Chairmanship of Dr. D. P. Kane was appointed by the Vice-President, CSIR."

5.33. Asked if any new equipment was also purchased, the Director, RRL. Hyderabad replied "No new equipment was purchased." As regards to gas holders, the witness stated, "The Nargundkar Committee estimated that at Rs. 4 lakhs we have not yet purchased that". The Committee asked about the need for including gas holders in the estimates when it was only an experimental project. The witness replied "We did not want to convert into a commercial concern. We thought that if it was not done, we would have spent much more money in experimentation. So we thought we could recover a part of it." The witness added "There has been no expansion of objects. Expenditure has gone up due to factors explained. When we are already pressed with money, nothing would have been recovered, if gas was first flamed."

5.34. The Committee asked why orders were placed for purchase of equipment before getting the revised estimate approved by Government. The Director, RRL, Hyderabad stated "The agreement was signed in July-August, 1966. I had signed the agreement, I repeat for 22 to 23 lakhs French Francs and that agreement was limited to this amount for which sanction of the governing body existed with me. Subsequently it had gone up due to devaluation. Since there were blanket orders to off set the effect of devaluation, it was not necessary to obtain any fresh sanction." In a written reply, the C.S.I.R. have stated: "Foreign exchange under French Credit to the extent of Rs. 22·43 lakhs (equivalent to F.F. 2,310,000) was released to the RRL, Hyderabad on 30th March, 1966, on the basis of Governing Body's approval to the Coal Gasification Plant in September, 1964 at an estimated cost of Rs. 45·50 lakhs. An import licence was obtained on 3rd May, 1966. On 6th June, 1966, the rupee was devalued. The value of import licences obtained before devaluation was automatically enhanced to Rs. 35,427 lakhs by the Government of India *vide* CCI&E Public Notice No. 90-ITC(PN)/66, dated 27th June, 1966. No separate sanction for additional foreign exchange release was, therefore, necessary. The Laboratory placed orders against the said foreign exchange release on 25th July, 1966."

5.35. In another written reply, the CSIR have stated: "The Regional Research Laboratory (Hyderabad) has intimated that the total expenditure incurred on the project is Rs. 35.12 lakhs. Further commitment for payment under French Credit is Rs. 33.38 lakhs based on the current exchange rate (upto 31st January, 1970)."

5.36. The Committee asked whether at the time of placing the orders in July, 1966, the Director was aware that the estimate needed revision. The witness stated: "I knew only to the extent of the devaluation and the financing charges and interest to be paid. The sanction that we should take interest had been taken into account. These are the normal sanctions which are given, when the Finance Ministry agreed that it would be placed in the AID Programme. This is not the only thing. In the whole of CSIR, we must have purchased many things, after devaluation without fresh sanctions. The original sanction was there giving the foreign exchange and, therefore, no separate sanction was needed." He added: "So far as Rs. 82 lakhs is concerned, that was the amount which I thought we would need from 1969, when the plant would have been erected, for a period of six years. I could not ask for sanction in 1966 for expenditure I would be incurring in 1968-69. It was indicated that this was the expenditure for running the plant for 5 years."

5.37. The Committee asked about the amount of expenditure incurred on the project after the decision of the Governing Body not to continue the project. The Committee have been given the following figures:

Expenditure incurred on Coal Gasification Plant from July 1967 to January 1970

	Foreign	Indian	Custom duty	Building	Contin-gencies	Total
From July 1967 to March 1968	1,56,576·81	35,961·12	1,01,727·08	62,153·83	9,664·62	3,66,083·46
1968-69	5,30,621·86	47,445·73	..	15,322·45	484·00	6,13,874·04
1969-70 (upto 31-1-1970)	2,59,211·30	..	..	(—)195·18	(—)3,351·35	2,55,664·86
				TOTAL Rs.		12,35,622·36

"The payments shown under Foreign Head have been mainly made for equipment imported under Franch Credit. These payments are made in half-yearly instalments against promissory notes issued after signing the agreement with the French suppliers.

The expenditure shown under Indian Head is for equipment ordered earlier (prior to July, 1967). Most of these were received before July, 1967. This also includes freight for the equipment imported from France.

The expenditure during 1968-69 includes that for the 350 HP motor obtained from Heavy Electricals Ltd., Bhopal, for which the order was placed in 1966. The customs duty is for the equipment imported from Germany for which the amount was deposited with DGS&D but the adjustments were made during 1967-68.

The expenditure shown under buildings is for settlement of the contractors' bill for the fencing, underground water tank, sanitary facilities at the plant site. The work was completed sometime during 1967-68. The payments were made during this period. This also includes expenditure incurred upto August, 1967 on sheds for oxygen plant and stores at Moula Ali.

The credit shown during 1969-70 under contingencies is for items which were transferred to the laboratory. Items like welding electrode, cable compound etc. were transferred to laboratory as they are likely to become damaged by storage for a long period.

Besides these, expenditure for electricity for lights at Moula Ali where some of the equipment is stored partly erected and partly in crates is being incurred. Six Chowkidars are also on duty in shifts guarding the equipment."

5.38. The Committee enquired of the representative of the Ministry of Finance whether a fresh sanction was not necessary in this case in view of increase of expenditure for Rs. 45 lakhs to Rs. 72 lakhs. The representative of the Ministry of Finance stated that the question of increase in estimate was considered by the Ministry of Finance who made the following observations:

"As the scheme has already been approved by the CSIR and the Governing Body of CSIR, it is not necessary to obtain a third approval again for the revised estimates of cost. In view, however, of the substantial alteration to the original estimates, the matter should be placed for information before the Finance Sub-Committee and the Governing Body at their next meeting."

5.39. The witness added that their estimates were placed before these two bodies and necessary action was taken. So far as Finance were concerned, they left it to the Governing Body and Finance Sub-Committee to take a decision as to the actual expenditure to be incurred.

5.40. Explaining the present position, the Director, Regional Research Laboratory stated that one-third of the plan was erected in 1967, while two-third was lying created and supplier's guarantee of specification had also expired. The witness added that "the plant lying in this create will rust and Rs. 72 lakhs which has been spent will be really a waste."

5.41. The Committee desired to know the steps taken to utilise the plant in pursuance of the recommendations of the Expert Committee. In a written reply, the CSIR have stated as follows:

5.42. "The Report of the Kane Committee was placed before the Governing Body of the CSIR at its meeting held on 14th May, 1969 who endorsed the following recommendation made *inter-alia* by the Technical Committee of CSIR at its meeting held on 11th May, 1969":

'It was brought to the notice of the Committee that the Ministry of Petroleum & Chemicals had decided to instal three coal based fertiliser plants and the Coal Gasification Plant may be useful to the Ministry for their experimentation. It was recommended that the Ministry of Petrolum and Chemicals may be asked to take over this plant in case they needed it'.

Even before the above decision of the Governing Body in May, 1969, to approach the Ministry of Petroleum and Chemicals for taking over the Plant, the Director General had written to the Chairman, FCI on the basis of Kane Committee Report. In reply, FCI had stated that they are interested only in certain parts of the plant.

It was, therefore, proposed that an advertisement may be inserted in the Press to ascertain if there are other parties interested in the plant instead of writing individually to likely parties. Accordingly, the orders of the Vice-President, CSIR were obtained for advertisement in papers for sale of the plant on 'As is where is' basis.

In the meantime, as letter was received from the Chief Minister, Andhra Pradesh mentioning that the Singareni Collieries Company as well as the State Government would be very much interested in examining the possibilities of utilising the Gasification Plant and the services of RRL, Hyderabad for purposes of setting up coal-based industries in Ramagundem-Kothodudem area.

The Vice-President, CSIR wrote to the Chief Minister, Andhra Pradesh that the Andhra Pradesh Government may take over the Plant and operate it and the RRL, Hyderabad would provide necessary technical assistance and expert guidance for the purpose.

In reply, the Chief Minister has stated that while the State Government is interested in promoting coal-based industries in Ramagundem-Kothagudem area in view of the excellent potentialities, neither the State Government nor the Singareni Colleries is in a position to take over the financial responsibilities of taking over and running the plant. The Chief Minister, Andhra Pradesh has further stated that the Government of India have decided to set up a coal-based fertiliser factory at Ramagundem and it would therefore appear more appropriate that this plant is transferred or sold to the FCI on the condition that this should not be disturbed from the present location. In case, the FCI is reluctant to take over this plant, the CSIR itself should find the required money for completing this plant.

On receipt of the above letter dated 18th November, 1969 from the Chief Minister, Andhra Pradesh and on the advice of the Vice-President, CSIR, the Director General addressed a letter to the Minister of Petroleum and Chemicals and Mines and Metals for taking over the plant. A reply has been received from the Ministry and their views are given below:

(i) Fertiliser Corporation of India (FCI) have reiterated their earlier opinion that they are not in need of the entire plant. FCI seems to be prepared to purchase certain special auxiliary items such as Oxygen Plant, compressors, etc. while could be used by them for general research and development activities;

(ii) The Expert Committee appointed by the Government for setting up a fertiliser plant have finally recommended the adoption of the Koppers Gasification process since they did not find the Lurgi process suitable. Unfortunately the Plant at Hyderabad appears to be a Lurgi plant. Such a plant does not seem to be of any use to FCI.

The Ministry suggested that we may approach the FCI on the lines indicated in sub-para (i) above for disposal of the R.R.L. Plant.

In view of the latest reply from the Ministry of Petroleum & Chemicals, the following course of action has been suggested:

(i) Advertisement to ascertain if there are other parties interested in the plant;

(ii) Handing over the plant to the Andhra Pradesh Government with the request that they may undertake the responsibility for running the plant with technical assistance from RRL, Hyderabad since the Ministry of Petroleum and Chemicals have intimated that FCI is having their Fertiliser Plants on 'Koppers' and not on 'Lurgi' Gasification Process.

(iii) RRL, Hyderabad may be authorised to erect the plant in the campus of the Laboratory and run it as a testing unit for a limited number of days according to the alternative recommendation of the Kane Committee.

The matter is receiving consideration of the President, CSIR."

5.43. In the Committee's opinion, the coal gasification project started at Hyderabad, is a glaring example of mismanagement, culminating in waste of public funds given for scientific research.

5.44. In the first place, there was a confusion about the objectives of the Project. As pointed out by the Kane Committee, it was "never clear whether the plant was to be established to produce synthesis gas for production of ammonia or industrial and domestic gas to be supplied to the city of Hyderabad". As initially approved, the project envisaged the installation of a continuously operating plant that would produce synthesis gas or equivalent fuel gas. In successive revisions of the estimates for the project that thereafter occurred, provision was made for additional units which were necessary only for a scheme which envisaged supply of town gas or industrial gas. However, items like distribution lines, gas matters, burners etc., which were essential for such a scheme were left out. Moreover, in the final estimate there was no provision even for a conversion unit without which, according to the Kane Committee, production of synthesis gas was also not possible.

5.45. In the second place, the estimates for the project were not drawn up with care, with the result that by stages the cost escalated from Rs. 21 lakhs to Rs. 1.89 crores. How faulty the estimating was would be evident from the fact that the first estimates were approved before the laboratory had even ascertained the cost of the equipment from the suppliers.

5.46. Thirdly, the equipment that was ordered was a semi-commercial scale unit of a type which had been successfully developed for commercial operation overseas. If the idea of the project was to study gasification characteristics of coal, a smaller plant on a laboratory scale might have sufficed. The C.S.I.R. have themselves admitted that "instead of choosing the step of developing a gasification process de novo and proving it on a small plant and taking it on to an intermediate scale pilot plant, the other alternative of buying an intermediate scale plant based on the best know-how available ... was chosen." It is clear therefore that the project was undertaken on a much larger scale than necessary.

5.47. Fourthly, orders for the imported equipment were placed shortly before a large-scale revision of estimates, which raised its cost from Rs. 45.50 lakhs to Rs. 189 lakhs, took place. This was not prudent, as it committed the CSIR irretrievably to the project.

5.48. In the fifth place, a pilot plant involving such a substantial investment was proceeded with, without securing the association of prospective users of the process with the venture.

5.49. Lastly, due to a failure of co-ordination, the fact that a similar pilot plant had been successfully commissioned in another laboratory, escaped notice both at the time the project was sanctioned and at a subsequent stage when the revised estimates were approved.. It is regrettable that when the equipment with that laboratory was capable of being used for the purposes of this venture, orders were unnecessarily placed for a similar equipment for this project.

5.50. The cumulative result of all these lapses has been an infructuous expenditure of Rs. 35.12 lakhs with further commitments to the tune of Rs. 33.38 lakhs. Costly equipment imported for the project lies unpacked with the danger of its being rendered absolutely useless.

5.51. The Committee would like a comprehensive investigation to be made into the case to pinpoint responsibility. Steps should also be taken forthwith for the disposal of the equipment, if there is no further use for it, so as avoid further losses.

Low shaft furnace pilot plant for production of pigiron

Audit Paragraph

5.52. For producing pig iron from sub-standard raw materials available in the country, the National Metallurgical Laboratory, Jamshedpur, set up a low shaft furnace pilot plant in February 1959. Upto March 1968, Rs. 131.66 lakhs were spent on the installation and working of the plant as follows:—

	Expenditure (In lakhs of rupees)
Equipment, apparatus and building etc.	34·95
Salaries of staff (142* persons)	27·23
Raw material	30·16**
Contingent expenses	39·32
TOTAL	131·66

*As on 1st August 1967.

**Inclusive of Rs. 6 lakhs worth of raw material received as gift.

5.53. During 1958-59 to 1967-68 the Laboratory conducted 40 production operations covering a total period of 2 years 10 months and 24 days. The daily production during the period of operation was from 0.5 to 12.2 tonnes as against the plant's rated capacity of 12 to 15 tonnes per day. The pig iron produced was 3965.67 tonnes, out of which 2,397 tonnes were sold upto March 1968, at the rate of Rs. 310 per tonne, as against the production cost of Rs. 1,447 per tonne (worked out on the basis of raw materials and cost of establishment alone).

5.54. The Council has stated that the pilot plant is neither desired nor designed to work continuously purely from productional aspects in view; and that the primary purpose of investigation of any pilot plant is to conduct tests with different grades of raw materials to establish technical feasibility of the process. The Council has also stated that the low daily production was due to poor quality of raw materials, manual feeding of raw materials into the furnace and removal of the products also manally.

5.55. Conceding all this, although nearly nine years have passed since establishment of the plant there has been no independent expert assessment regarding the need for its continued working. The Council has, however,

intimated (March 1969) that an expert committee has since been appointed to review the working of all the pilot plant projects in the national laboratories/institutes.

[Paragraph 117 of Audit Report (Civil), 1969]

5.56. The Committee desired to know whether at the time of establishing the pilot plant, any estimate was prepared of the cost of the scheme the period for which it should be run etc. and if so how the actual expenditure and the time taken compared with these estimates/targets. In a note, the C.S.I.R. have stated:

> "An estimate was prepared for the capital cost of the pilot plant as well as capital recurring expenses for the operation of the pilot plant. The entire pilot plant with its ancilliaries was supplied on a "turnkey" basis, *i.e.*, the cost included its installation and operation for the test trial period. The total cost involved was about Rs. 20,00,000/- out of which about Rs. 13,00,000/- was in foreign currency. In so far as the estimate for the period for which it should run is concerned it may be mentioned that as investigations on the pilot plant were considered as research on large scale for developmental purposes, the period of its operation was not envisaged. The expenditure depends on the test trial period. The proposals for the purchase of raw materials etc. under the recurring grant, and for the purchase of spares etc. under the capital grant were duly put up and approved by the Executive Council of the National Metallurgical Laboratory prior to incurring the expenditure involved."

5.57. During evidence, the representative of the National Metallurgical Laboratory stated that after the plant was erected, it was thought that about Rs. 5 to 6 lakhs would be needed per year of operation but no detailed estimate was proposed at that time. The actual recurring expenditure was about Rs. 7 to 8 lakhs on raw materials, payment of salaries of staff, contigencies, spares etc.

5.58. The Committee asked how the CSIR satisfied themselves with the functioning of the plant *vis-a-vis* the expenditure incurred over the period of nine years. In a written reply, the C.S.I.R. have stated:

> "The laboratory submitted periodical reports of the activities of the Low Shaft Furnace Pilot Plant to the Executive Council, National Metallurgical Laboratory. Being a pilot plant, useful trials with various sub-standard grades of raw materials from different parts of the country were conducted. The activities have come up to the expectations and therefore the expenses incurred can be justified."

5.59. The Committee asked whether 40 production operations conducted during the past one decade constituted the optimum number upto which the plant could be worked. In a note, the C.S.I.R. have stated: "Upto 31st March, 1969, 42 smelting campaigns were conducted. Each smelting campaign was conducted with a definite objective in view. Apart from the investigations undertaken by the laboratory with the different grades of raw materials purchased by the laboratory, extensive investigations were undertaken with raw materials sent by the different State Governments or parties. The operations of the plant depended on the availability of raw materials. Feasibility reports/investigation reports were duly sent to them. A report was sent to the Planning Commission, Government of India.

5.60. It is considered that the number of trials having definite objectives conducted during the period is quite satisfacory. All the tests were conducted with hitherto unexploited raw materials and considerable difficulties were experienced in their exploitation. All raw materials could not be used for iron smelting." During evidence, the representative of the Laboratory stated "We had expected to run the pilot plant for about 120 days in a year and I think we had come to that expectation."

5.61. The Committee have been informed that: "The firm in West Germany and the suppliers also recommended a process for utilisation of non-coking coals for making iron. However, extensive investigation proved that the recommended process was not suitable under Indian raw material customs. The laboratory has been able to evolve suitable operational techniques for the exploitation of hitherto unused raw materials of sub-standard grade particularly non-coking coals. It has been found that the technique developed is suitable for commercial adoption.

"A the entire smelting trials are conducted with raw materials of sub-standard grade and as the quality of raw materials changes from campaign to campaign, every possible attempt was made to produce pig iron to conform to the standard specifications of foundry grade pig iron. The pig iron produced is of good quality and comparable with those available in the market."

"Based on the investigations in the pilot plant, the cost of production in a commercial plant has been calculated and it has been found that the technique evolved by the laboratory can be exploited commercially."

5.62. The Committee drew attention to high cost of production of pig iron *i.e.*, Rs. 1,447 per tonne as against the sale price of Rs. 310 per tonne. The representative of the laboratory stated that if the cost was calculated on the basis of the plant working for 120 days in a year, it would come to

about Rs. 470 to 500 per tonne depending on the fuel used. He add the staff were working in the intermittently and were also conducting researches in various other research projects of the Division.

5.63. The Committee asked whether any part had taken advantage of the research withdraw by the laboratory by setting up whole time production units. The representative of the laboratory stated: "On the basis of the tests we had conducted the Punjab Pig Iron Ore project was about to be installed but Punjab was divided into two parts and the project has been put in the cold storage. We are pursuing it. For the Talchar project of Orissa Government we conducted tests on behalf of the State Government but whether the project will be sanctioned by the Government of India or not I cannot say. Same remakers apply to Andhra and Maharashtra Government Projects we have taken it up with the Maharashtra Government."

5.64. The Committee drew attention to the fact that a Working Group on Fourth Plan projects constituted by the Vice-President of CSIR had recommended the discontinuance of 21 projects of which this was one. They asked whether a final decision had been taken in regard to this project. The Director General C.S.I.R. stated "I may just mention this that this particular low shaft furnace which was started was, in my view, with a view to testing and evaluating some of the ores. It may be that during its performance most of the ores required fuel which they were not getting. It was suggested to the Director that this was a very costly sort of project which was run in the laboratory. He was asked to look into it whether this should be stopped. He was asked to find out since how long this was in operation. He told me that he hoped that it would be possible to provide a big plant and sell this plant and recover at least the cost of the raw materials from the wastes. He is examining this. I do not think that this plant otherwise will have such a large amount of work that it would be engaged for the whole year."

5.65. The Committee desired to know whether the laboratory had tested all the available low grade materials in the country. The representative of the laboratory stated "I cannot say we have tested all raw materials available in India. Some iron and other mines are still being developed. Asked about the percentage of known low grade materials tested, the witness replied "About 80—85 per cent." The witness added:—

> "If this low shaft furnace pilot plant at the MML is abandoned and in future the question of testing of raw-material arises we would not have any alternative but to send our raw-materials outside for testing involving heavy expenditure in foreign exchange. Asked whether the new materials could

not be tested in the laboratories of the Iron and Steel Industry, the Director General, S.I.R., stated that "The Iron and Steel Industry have big furnaces but not a testing plant of this type.....It was actually the recommendation of the Metals Committee of the CSIR that such a testing plant with low shaft furnace should be set up." When asked whether it was justifiable to continue a pilot project for more than nine years, the witness stated "It has been named a pilot project but actually it is testing and evaluation plant for testing and evaluate on of ores and raw materials.....I think why this question arose, a large number of staff kept on the plant and the problem was how to utilise that staff."
In a written reply, the CSIR have stated:

"This is a testing unit and can be considered as an asset to the country. It demonstrates the feasibility of employing hitherto unused raw materials. It eliminates the necessity of sending the raw materials to a foreign country for testing and therefore saves a large amount of foreign exchange. It has also been used as an experimental blast furnace to demonstrate the possibility of naphtha injection for iron smelting purposes."

5.66. With regard to the decision taken on the recommendation of the Working Group, the C.S.I.R. have stated as follows:—

"The Working Group appointed by the CSIR for the Fourth Plan proposals recommended "that there may not be any necessity for continuing the work on low shaft furnace pilot plant for pig iron smelting and it was also recommended that the staff working in this plant may be shifted to work in the new pilot plants that are recommended to be set up." After the above recommendation was received, further investigations were undertaken at the low shaft furnace plant because of their immediate importance, to determine the profitability of this small furnace to produce pig iron under the best raw materials available.

At a joint meeting of expert representatives of all the Steel Plants of the country convened at the National Metallurgical Laboratory held on 5th February, 1970, it was unanimously decided to test the benefits of pre-reduction of iron ores on smelting characteristics. The other programmes envisaged for the Low Shaft Furnace are as follows:—

(i) Evaluation of formed coke prepared by CFRI, Jealgora for pig iron production.

(ii) Possibility of production of ferro-phosphorus in the low shaft Furnace.

(iii) Testing and evaluation of raw materials of M.P.

It may, therefore, be necessary to extend the working of this facility to investigate this important problem of the steel industry."

5.67. The Committee, however, find that the Pilot Plant Committee, appointed by the CSIR, have in their final Report made the following observations about this Plant:—

> "Yet another instance of a 'Pilot Plant' established at considerable expense that has found no useful application is the low shaft furnace at the NML, Jamshedpur. Established with an investment of Rs. 17 lakhs and considerable recurring cost, this plant was expected to assist in setting up low shaft furnaces for the production of pig iron from locally available ores in the various States of India. During eleven years of its existence, raw materials from 14 different States were reported to have been tested in this plant. Except for one State, Maharashtra, which contributed towards expenses of the investigation to some extent, all other investigations were carried out at the cost of the NML. So far, not a single low shaft furnace has been established in the country for production of pig iron with know-how obtained from this plant."

5.68. The Committee are dissatisfied with the working of this pilot plant. It has been in operation for over a decade during which the expenditure on it has amounted to over Rs. 1.32 crores. The bulk of the expenditure (Rs. 96.71 lakhs) was on recurring expenses for which detailed estimates were not prepared before the project was sanctioned. The overseas firm which supplied the equipment (cost Rs. 20 lakhs) had recommended a process for its operation which the laboratory did not find suitable under Indian raw material conditions.

5.69. The Plant was set up to establish the suitability of low-shaft furnaces for production of pig iron from locally available ores in various States. A variety of ores have been tested but the results have not been satisfactory either in terms of cost or quality of the end product. The cost has amounted to Rs. 1,447 per tonne, against which the product has been sold at Rs. 310 per tonne. It has been stated that "the technique evolved by the laboratory can be exploited commercially", but the Committee are sceptical about this claim, in the absence of any assessment in this regard by expert engineering and design consultants familiar with the problems of scaling-up of operation.

5.70. Another significant feature of the operation of this plant is that, except for one State, which contributed towards investigation expenses to some extent, none of the other (13) States sponsored work on this project. Consequently the laboratory has had to carry out the work on its own, while the prospective user remained dissociated from it.

5.71. A Working Group constituted by the CSIR recommended that this project should be scrapped. Thereafter, an Expert Committee on Pilot Plants (Kane Committee) set up by the CSIR pointed out that the Plant has "found no useful application." "So far", that Committee stated, "not a single low-shaft furnace has been established in the country for production of pig iron with know-how obtained from this Plant."

5.72. Taking all the foregoing considerations into account, the Committee feel that it would not be wise to continue this pilot plant any longer. The matter should be remitted for an immediate decision by the Board of Scientific and Industrial Research.

Project for synthetic of silicon carbide

Audit Paragraph

5.73. In April 1966 the Governing Body of the Council approved establishment of a pilot plant project for synthesis of silicon carbide at the Regional Research Laboratory, Hyderabad. According to the approved programme, the project was to be completed in three years (commencing from 1966-67) at an estimated cost of Rs. 29.10 lakhs. The sale proceeds of the product during this period were estimated to be Rs. 22.77 lakhs. It was also envisaged that production of silicon carbide would result in saving of foreign exchange of about Rs. 75 lakhs annually and facilitate setting up and growth of several other industries.

5.74. The Laboratory placed an order in May 1966 on M/s. Heavy Electricals (India) Ltd. for a 1,000 KVA transformer at a cost of Rs. 2.69 lakhs (subsequently revised to Rs. 2.92 lakhs). The transformer was to be supplied within two years. Later on, the Council felt that the position of funds required for the project as a whole was not satisfactory and decided to explore the possibility of setting up a two-ton per day prototype plant, in collaboration with some industrial firms, who could invest the money. An industrial firm on being contacted by the Laboratory agreed to set up such a plant at its works in Kerala. Having learnt from this firm that it had spare 500 KVA transformers (which could be used for up-scaling experiments) the Laboratory enquired from Heavy Electricals (India) Ltd. in October 1967 whether it would be possible to cancel the order for 1000 KVA transformer at that stage. The Company turned down the request of the Laboratory in November 1967 as it had already started the fabrication of the equipment. The equipment has, however, not been delivered so far (January 1969), although contrary to contractual stipulation, the Company has already been paid Rs. 2.63 lakhs.

5.75. As it was not found feasible to set up a proto-type plant in collaboration with industrial firms, the 1,000 KVA transformer, on receipt from the Company, is now proposed to be installed to run certain experimental furnaces for production of silicon carbide and for collection of data for designing a commercial plant.

[Paragraph 121 of Audit Report (Civil), 1969].

5.76. The Committee have been informed by C.S.I.R. that "According to the note placed before the Governing Body of the CSIR at its meeting held on 16th April, 1966, the Regional Research Laboratory, Hyderabad initiated research work on the silicon carbide project in 1960. The earlier experiments were mainly directed towards an evaluation of raw materials for their suitability for the preparation of silicon carbide and a basic study of the optimum conditions for the synthesis on a bench scale. Since 1962 efforts were directed towards the designing, fabrication and operation of an experimental silicon carbide furnace possessing the basic design features of a pilot-plant furnace but with a capacity commensurate with that of the transformer available. An experimental furnace was operated at 2,000—2,300°C for periods ranging upto 40 hours. The furnace was re-designed and the capacity was progressively increased so as to yield about 30 Kgs. of silicon carbide per run. In order to scale up the experiment and to design fabricate and operate a plant with an ultimate capacity of 600 tonnes of processed grain per year, a pilot plant proposal was submitted to the Governing Body on 16th April, 1966 at as estimated cost of Rs. 29.105 lakhs approximately and with a foreign exchange content of Rs. 3.310 lakhs after the proposal was approved by the Executive Council of the R.R.L., Hyderabad at its meeting held on 27th February, 1965."

"The Technical Committee of the Board at its meeting held on 14th April, 1966 recommended:—

> "that the project be accepted in principle, subject to the condition that the foreign exchange component will be found by the Ministry of Defence (Department of Defence Supplies). The possibility of entering into a collaborative agreement with the industry be also looked into."

"On 7th June, 1966, the Director, R.R.L., Hyderabad sent a revised proposal envisaging an expenditure of Rs. 47.25 lakhs with a foreign exchange content of Rs. 4.52 lakhs. It was stated that the original proposal was put up to the Executive Council almost two years ago. The main reasons for the increase over the originally estimated costs were:—

(a) increase in the cost of transformer and HT cables by about Rs. 1.5 lakhs;

(b) increase in the cost of electrolytic grade copper required from almost Rs. 15 Kg. prevailing two years ago to Rs. 30 Kg.;

(c) furnaces would require brass terminals weighing nearly 3½ tonnes. The increase in the cost of brass amounted to Rs. 0.50 lakhs;

(d) a special magnetic separator which was originally estimated to cost Rs. 50,000 was now quoted at Rs. 1.2 lakhs including spares and accessories. Similarly a special vibro-screen required for grading the grain had been quoted at Rs. 15,000 more than its earlier quotation;

(e) with a view to making the pilot plant self-contained in operation, it had become necessary to make provision for suitable conveying and handling equipment in the present proposal;

(f) among the recurring costs, the cost of electricity almost amounts to 50 per cent of the total recurring costs. Electricity Tariff rates had increased by 50 per cent. Consequently, a corresponding increase in the cost of utilities had to be provision for; and

(g) with a view to make the project self-sufficient, it had been found necessary to provide for adequate engineering staff for the design, fabrication and erection of the various items of plant and machinery. The cost of these services was also included in the present estimates."

"The Director, R.R.L., Hyderabad requested for provision of necessary funds and for approval of the revised proposal at an expenditure of Rs. 47.25 lakhs approximately in June, 1966. He was requested to intimate the result of negotiations with M/s.....(a private firm at Bombay) Ltd. who had shown interest in the project. However, negotiations for industrial collaboration with the firm could not come through as they did not agree to share in the capital cost of the project."

"While negotiating for participation with the firm, the R.R.L. (H) was also simultaneously processing the proposal for fabricating a 1,000 KVA Transformer, one of the key instruments required for scale up of the plant, with M/s. Heavy Electricals Ltd., Bhopal. The final quotation of the firm dated 16th March, 1966 was accepted by the Laboratory in May, 1966."

Funds for the project could not be provided in 1966-67 in view of the recommendation of the Governing Body of the CSIR at its meeting held in April, 1966 for industrial collaboration in the Project. However, when the Laboratory came forward with a specific proposal for purchase

of a transformer, the Executive Council of the Laboratory at its meeting held on 4th May, 1967 accorded *ex-post-facto* sanction for the purchase of the transformer at a total estimated cost of Rs. 3.30 lakhs subject to availability of funds in the year 1967-68.

"In 1967, the Regional Research Laboratory (H) held negotiations with M/s.....(an individual firm at Kerala) for collaboration in setting up an industrial unit at their site. In these negotiations, as part of their proposals, the firm desired that the Laboratory carry out upscaling experiments with the help of the 500 KVA transformer only available with the firm. But this proposal did not materialise, as the negotiations with the firm fell through as they wanted assurance that no party will be granted permission by Government for foreign collaboration.

About the further developments in regard to this project, the CSIR have stated in a note that "DGSIR held discussions with the Director, RRL, Hyderabad on 28th September, 1968 and after detailed consideration agreed to provide an additional amount of Rs. 5 lakhs approx. required by the Laboratory to set up a ½ tonne plant in the Revised Estimates for 1968-69 and Budget Estimates for 1969-70 to enable the Laboratory to establish at a demonstrable level the technical and economic feasibility of the RRL (H) process and also to study the furnace designs and technique to optimise the parameters required for putting up a production plant.

The 1,000 KVA transformer with switch unit was received from M/s. Heavy Electricals Ltd., Bhopal on 10th May, 1969 and has been erected. Experiments will be carried out using one large furnace so that the necessary data for optimising furnacing conditions on a commercial scale and for checking the predicted electrical efficiencies will be obtained."

During evidence, the Director General stated "I do not think the thing was waiting for any special sanction of funds. Unless the key equipment was available, how could the pilot plant operate? Sanctioning funds for staff would have been mere expenditure in the absence of the key equipment. If, of course, we would have succeeded in getting the association of the Travancore firm for the 500 KVA transformer, perhaps some experiments on a somewhat higher than laboratory scale could have been conducted. But we wanted that before we hand over the process to a party, we should satisfy ourselves regarding the evaluation of all the data, both in regard to technical feasibility and in regard to economic feasibility. So we entrusted this work to Dastur and Co. My own feeling is that simply because we took a decision to put up a pilot plant, unless all the equipment that is needed for the pilot plant was available, we could not run the pilot experiments."

5.77. The Committee desired to be furnished with information on the following points:—

(i) Whether any study has been made of the commercial feasibility of the process by the Central Design and Engineering Organization of CSIR or any other agency.

(ii) If the findings are that a plant on commercial scale can be established, whether any steps have been taken by the National Research Development Corporation in the matter.

(iii) If the commercial venture can be established, whether it is necessary to continue this pilot plant.

(iv) Whether any offer for commercial utilisation of the process been received by the National Research Development Corporation subsequent to a technical report submitted by M/s. Dastur & Co.

5.78. The CSIR have furnished the following information seriatim:—

(i) "A Feasibility Report for the manufacture of two tonnes per day of Silicon Carbide was prepared by the Central Design & Engineering Organization (CDEO) at the request of National Research Development Corporation (NRDC) and submitted on 31st July, 1967. According to the Report, two tonnes per day capacity plant is considered to be the minimum for economically operating the Plant."

"For a proposed two tonne capacity plant which is considered to be minimum economic unit for operating the pilot plant, the total outlay has been estimated at Rs. 26.30 lakhs [Rs. 19.87 lakhs as fixed capital (including Rs. 4.90 lakhs for processing building) and Rs. 6.43 lakhs as working capital] whereas R.R.L. (H) had estimated the cost at Rs. 47.25 lakhs for a 600 tonne plant".

"The cost of production for two tonnes per day pilot plant has been estimated at Rs. 2,994 per tonne. Adding cost of packaging material and selling expenses as Rs. 90,000 and interest on investment @ 7 per cent as Rs. 1,84,100, the cost price per tonne of Silicon Carbide works out to Rs. 3,451."

"While considering the location of the Plant, considerable importance is to be given to a place where cheap and abundant electric power is available, as this being the major item of expenditure. Even on the pilot plant of 2 tonne/day capacity, 25,400 Units of electricity would be needed per day. The place should not be too far away from the source of raw materials and the market for the product."

(ii) "The N.R.D.C. has intimated that an advertisement was issued inviting applications from interested parties for financial and technical collaboration in setting up 10 tonne per day or a viable industrial plant of smaller capacity. Consequently a number of firms evinced interest for the collaboration in the said project. Meanwhile R.R.L. got a "Feasibility Report" prepared from M/s. M. N. Dastur and Co. Pvt. Ltd., Calcutta."

"It may be mentioned here that NRDC/RRL first explored the possibility of putting up a 2 tonne day plant in association with M/s..... (the firm at Bombay) who held the industrial licence. They wanted RRL to set up a commercial plant and if they are satisfied they promised to buy the plant. It was not, however, possible to arrive at an agreement with the firm on the terms decided by the Governing Body of C.S.I.R. M/s.....(the firm at Kerala) Ltd. were then approached. They were prepared to go ahead with the project on the basis of indigenous know-how only if it was guaranteed that no foreign collaboration would be permitted. Negotiations with Government Porcelain Factory likewise could not also bear fruit. Efforts to persuade M/s.....(a firm at Jamnagar) and M/s.....(a firm at Madras) for collaboration in this venture could not succeed because of the licence for foreign collaboration with Norton of USA.

(iii) "It is necessary to carry out the present phase of upscaling the furnacing operation (only) with a view to practically assess the predicted efficiencies and yields and also to explore the possibility of improving the efficiency and yields further."

(iv) "The N.R.D.C. has stated that Regional Research Laboratory (Hyderabad) got a "Feasibility Report" prepared from M/s. M. N. Dastur and Co. Pvt. Ltd. According to them a plant with a capacity of 1800/tons per year would be marginally profitable, and one with a capacity of 2,400 tons per year would be more profitable, but not as highly profitable as the 3,000 tons per year plant. The capital investment for 3,000 tons per year plant is expected to be about Rs. 1 crore. The cost of production with power rate of 5 paise per KWH is estimated at Rs. 2,413 per tonne of silicon carbide. With the selling price taken at Rs. 3,250 per tonne the project would appear to be quite profitable."

The firm who had envinced interest in the project were intimated about the findings of M/s. M. N. Dastur & Co. and were also informed that complete report can be supplied to them at a cost of Rs. 1,000 by

RRL (H). A few firms have purchased the feasibility report. So far the seven firms have submitted their offer to NRDC in this venture.

It may be mentioned here that Industrial Licensing Committee has been considering the question of permitting foreign collaboration to M/s.....(the firm at Bombay) with Norton of U.S.A. for quite some time. NRDC has been apprising the Ministry of the action being taken up by it in connection with the setting up of a plant with indigenous know-how and requesting them to defer consideration of the foreign collaboration case of M/s.....

The Board of Directors of NRDC at its meeting held on 12th February, 1970 have constituted a committee to go into whole question and discuss terms etc. with the firm who have evinced interest in undertaking commercial exploitation of the process.

"During evidence, when the Secretary, Ministry of Industrial Development was asked whether foreign collaboration sought by the firm at Bombay had been approved, he stated "There are applications pending with us and we have decided to wait and see the result of C.S.I.R.'s experimentation with the pilot plant."

5.79. The Committee feel that there has been avoidable delay in implementing this project which could be a potential foreign exchange conserver. The proposal for a pilot plant was put up for approval sometime in 1964, but it was not finally approved till 1966. Thereafter, the Heavy Electricals, who were to supply a transformer needed for operating this plant delayed the supply by a year.

5.80. The Committee note that the commercial feasibility of the process has been established by a study conducted by a firm of engineering consultant as well as the Central Engineering and Designing Organisation, C.S.I.R. Necessary 'upscaling operation' to corroborate these findings are stated to be in progress. These should be expeditiously completed and the N.R.D.C., which is stated to have offers from certain interested parties should also finalise the arrangements for leasing out of the process.

Delay in Transferring a Pilot Plant and recovering its cost

(Central Salt and Marine Chemical Research Institute, Bhavnagar)

Audit Paragraph

5.81. On receipt of request in 1961 from a firm in Bombay for imparting necessary technical know-how to them or the manufacture of Potassium Chloride and Epson Salt from mixed salt, the Institute procured requisite equipment worth Rs. 2.99 lakhs and erected a pilot plant in the premises of the firm's factory at Kandla in March, 1964. In May, 1964 it was

found necessary to modify the process. Consequently, additional equipment worth Rs. 2.75 lakhs was purchased in January, 1966. The erection of the Plant was completed in March, 1966, and the total expenditure incurred by the Council on erection and pay allowances of staff (including staff diverted from other projects) worked out to Rs. 5.79 lakhs upto March, 1967.

5.82. The project was implemented by the Council on the understanding that on satisfactory completion it would be transferred to the firm at cost-price plus payment of royalty. Although the plant was commissioned into service in April, 1966 and the firm is selling the manufactured products, the transfer of the Plant has not been effected so far. The Council has stated that the terms and conditions of transfer as also the rate of royalty to be paid by the firm are under examination (April, 1967).

[Paragraph 5 of Audit Report on the Accounts of CSIR, 1965-66.]

5.83. The Committee desired to know the present position in regard to the settlement of the terms and conditions of the transfer and the recovery of the Council's dues from the firm for erection of the plant. In a written reply the CSIR have stated, "The matter was discussed in a meeting between the representatives of the concerned Salt Works, Kandla and the Director-General, Scientific and Industrial Research on 9th February, 1970. It has been stressed by Director-General, Scientific and Industrial Research that the Salt Works should pay back the cost of the plant since they had taken over the plant in 1966. It was agreed that specific proposals in this connection will be submitted for consideration of Director-General, Scientific and Industrial Research.

"The Chairman, Salt Works and Director-General, Scientific and Industrial Research had agreed by exchange of letters that the Institute might hand over the plant at the end of the trial period realising the actual cost."

5.84. The Committee are distressed over the delay in recovering a sum of Rs. 5.79 lakhs spent between March, 1964 to March, 1969 for erecting a Plant in the premises of a firm at Kandla for imparting technical know-how to it for the manufacture of Potassium Chloride and Epsom Salts from mixed salt. In spite of the fact that the Plant has been commissioned from April, 1966 and that there was a clear understanding with the firm that, on its satisfactory completion, the plant would be transferred to the firm at cost price plus payment of royalty, the terms and conditions of the transfer and the question of recovery of the cost of the Plant and the quantum of royalty payable by the firm still remains to be settled. The Committee desire that the matter should be settled with the firm without further delay.

VI

MISCELLANEOUS

Loss in running drug farm.

Audit Paragraph

6.1. In order to promote cultivation of medicinal and aromatic plants (mentha, eucalyptus citriodora, etc.) departmentally and to encourage farmers to raise those plants, the Central Indian Medicinal Plants Organisation established, in 1963, a developmental and promotional farm at Haldwani on 250 acres of land allotted by the U.P. Government. In 1965-66 the farm was considered as a commercial unit.

6.2. During 1965-66, 1966-67 and 1967-68 the area under cultivation was only 113.00 acres, 126.35 acres and 67.25 acres respectively. The yield per acre of mentha during these years was 5.5 Kg., 9.63 Kg. and 6.4 Kg. while that of eucalyptus citriodora was 6.45 Kg., 3.66 Kg., and 2.4 Kg., respectively. During the same period, the receipts from the sale of products were Rs. 2.09 lakhs, as against the expenditure of Rs. 5.36 lakhs (Rs. 4.39 lakhs recurring and Rs. 0.97 lakhs non-recurring). According to the Council, the deficit was due to heavy expenditure incurred during the initial stages on the preparation of land, removal of tree stumps, grading, lay-out and levelling, etc. The deficit could, however, have been substantially reduced if the entire area available for cultivation had been utilisd, the required number of tubewells installed and the destruction of crops by stray animals prevented by proper fencing.

6.3. The Council has stated that "in 1965-66, when the farm considered as commercial unit, a proper programme for irrigation, fencing, construction of building, provision of improvised installation of distillation units, etc., was drawn, but the entire requirements could not be met due to paucity of funds. This is because it was decided that the expenditure of the commercial unit would be met from loan funds from the Government and this loan was not available in time due to administrative and financial reasons. The unit has again been changed into a developmental plus promotional unit (from November, 1968)".

[Paragraph 120 of Audit Report (Civil), 1969].

6.4. The Committee have been informed that "The farm at Haldwani was established in order to promote the growth of Mentha arvensis in the Tarain area and the main purpose was to supply suckers to the cultivators of Tarai area. About 1200 hectares are under Mentha Cultivation in the Tarain area. In addition to Mentha arvensis and Eucalyptus citriodora, the folllowing plants were raised in the farm (i) Rauvolfia Serpentina, (ii) Citronella both Java and Ceylon, (iii) ne-thum Graveolens, (iv) Palmarosa and (v) Jasmine.

6.5. Experiments were carried out for raising the following plants (i) Mentha Piperata (ii) Mentha Spicata (iii) Ocimum Kilimandscharicum and (iv) Ocimum gratisimum."

"The farm was declared commercial in 1965-66 as it was decided that the large scale cultivation of mentha arvensis shall be taken up. But since the cultivators of Terai Region took up the cultivation of Mentha arvensis on an area of about 3000 acres, it was decided to make it a promotional unit in order to concentrate on further development work on mentha, other medicinal and aromatic plants leading to large scale cultivation of these plants in U.P. particularly in the Mechanised Tarain Belt."

6.6. The Committee referred to the reduction in the cultivated area of the farm from 126.35 acres in 1966-67 to 67.25 acres in 1967-68. There had been attributed to drying up of the irrigation canal. Explaining the measures taken to improve the irrigation facilities in this regard, the C.S.I.R. have informed the Committee that "a shallow tube well was completed in 1967 and four pumping sets were installed for lifting water from adjoining Nallah. Steps have been taken up for boring of one tube well during the year 1969-70 and one in 1970-71." In reply to a question whether any programme had been drawn up to bring the whole area (250 acres) allotted for the farm under cultivation, it has been stated that "the programme of work is periodically reviewed and revised in accordance with the cultivation trends in the region. A revised cropping programme with anticipated receipts has been prepared. A special Sub-Committee has been constituted by the Executive Council CIMPO to suggest improvements. The report of the Committee is expected by the end of March, 1970." The Committee fined from the statement furnished by the C.S.I.R. that during 1969 an area of 38.15 hactores (95 acres) that was brought under cultivation. An area of 200 acres is proposed to be cultivated under cultivation during 1970-71.

6.7. As to the overall working results of the farm at Haldwani, the following data has been furnished:—

Year	Receipts	Expenditure Recurring including wages	Expenditure on Capital
1963-64	..	0·425	0·251
1964-65	0·476	0·855	0·291
1965-66	0·233	1·481	0·792
1966-67	0·594	1·594	0·120
1967-68	0·315	1·310	0·062
1968-69	0·996	1·789	0·202
TOTAL .	2·614	7·554	1·718

6.8. The Committee referred to office C.S.I.R. farm at Jammu, Srinagar, Bangalore and Coorg and asked for informaion on the following points:—

Whether the farms at Jammu Srinagar, Bangalore and Coorg are declared as commercial units.

the expenditure and receipts of each of these farms during each of the last five years, indicating the steps being taken to make the farms, self-supporting.

to extent to which these farms had been able to encourage outside production on a large scale of valuable farm products like pyrethrum, belladonna etc.

6.9. In a note the C.S.I.R. have stated as following seriatum:—

The farms in J & K which form a part of "Drug Farms and Factories in J & K" taken over from the State Government are run as commercial units. As regards the farms in Bangalore and Coorg they are promotional units, their main function being to provide the necessary plant material and guidance to the farmers for large scale cultivation of essential oil bearing plants in South India.

6.10. The C.S.I.R. have furnished the following statement showing receipts and expenditure of the Drug Farms in Kashmir, Jammu:—

*(I) DRUG FARMS KASHMIR

Year	Receipts	Expenditure Recurring including wages	Expenditure on capital
1963-64	..	0·058	..
1964-65	1·057	1·410	0·188
1965-66	1·601	2·573	0·473
1966-67	1·239	2·203	..
1967-68	1·576	2·974	0·003
1968-69	1·170	2·113	0·237
TOTAL	6·645	11·331	0·901

*(II) DRUG FARMS JAMMU

Year	Receipts	Expenditure Recurring including wages	Expenditure on Capital
1963-64	..	0·206	..
1964-65	0·122	2·443	1·715
1965-66	1·113	2·318	0·806
1966-67	3·089	3·370	2·390
1967-68	1·979	4·029	0·607
1968-69	1·090	4·103	..
TOTAL	7·393	16·459	5·518

*Units were taken over from the State Govt. w.e.f. 1-2-1964

As regards the Zonal Centre at Bangalore, the information is awaited.

6.11. It has been stated that broadly speaking the following steps have been taken to make the farm, (Commercial Units) self supporting:—

(i) Drug Farms, Jammu

The farms when handed over were infested with pericious weeds in most of the areas. No irrigation facilities were available in Drug Farm Chakrohi

and large areas remained uncultivated. The distillation unit which was in Chakrohi was too obsolete in design and its efficiency was very low, similarly the boiler installed at Chakrohi was very old.

Tubewells have been bored to provide water for irrigation, a new boiler has been improvised.

(ii) Drug Farms Kashmir

Pyrethrum plantation taken over from State Government had out-lived its productive age and the State Government had not drawn a phased programme for providing replacements. Consequently the plantation had to be rejuvenated and replaced in a phased way. The extension of new plantation has been phased gradually.

The Committee desired to know—

total acreage of each of the CIMPO farms at Jammu, Srinagar, Coorg and Bhangalore, the actual acreage under cultivation and the per acre yield of the principle products for each of the last five years.

details regarding the contribution made by these farms in developing indigenous production|cultivation of items which were or are being imported.

6.12. In their reply, the CSIR have stated:

"The information pertaining to Drug Farms J & K is reproduced below:—

	Total area	*Cultivable area
I. *Drug Farm Jammu*		
Chakrohi	1242 acres	1060 acres
Miransahib	36 ,,	
Katra	64·5 ,,	
II. *Drug Farm Kashmir*		
Yarikah	200 acres	980 acres
Mansabal	260 ,,	
Zainapora	320 ,,	
Bonera	150 ,,	
Allowpora	157 ,,	

*The area actually under cultivation has not been intimated.

As regards Coorg and Bangalore the information is being collected. As regards yield per acre it is not possible to arrive at any figure as the farms are still under development state. This can only be possible when the farms attain a take off stage."

6.13. The farms have contributed towards the indigenous production/ cultivation of items as follows:

"(i) Mentha arvensis is processed for isolation of Menthol which is hitherto being imported. The cultivation is being extended in order to meet the total requirements of the country.

(ii) Pyrethrum is converted into Pyrethrum Oleoresin a valuable insecticide. The production is being stepped up.

(iii) Large scale cultivation of ergot has been taken up and the isolation of its alkaloids is being taken up.

(iv) A valuable source of raw material for Xanthotoxin is being cultivated.

(v) Balladonna is grown in the farms and used for the manufacture of balladonna extracts, belladonna plaster and total alkaloids of balladonna."

6.14. In the first 'get-together' of Research and Industry held in 1965, it was decided that the CIMPO should circulate widely and particularly to the Forest Department of various projects reports on the important items of production in the farm, giving detailed technical advice regarding their cultivation, storage, marketting and economics of production and that a time-targetted programme in this behalf should be drawn up within six months for cultivation of these products. The Committee desired to know whether this was being done. The Committee have been informed that "Surveys have been conducted by the RRL in order to assess the availability of Dioscorea Deltodia in the State. A similar survey is being planned for assessing the availability of Belladonna, Ephedra etc. These surveys are undertaken in close collaboration with the Forest Deptt. In addition to this all necessary help is rendered to the Department for promoting growth of the medicinal plants."

6.15. The Committee desired to know—

(i) whether any plans have been drawn up for the commercial cultivation of Plantogo Ovata, which has been successfully cultivated on experimental basis in the National Botanical Gardens, Lucknow and the value of export of this plant at present.

(ii) whether a detailed study of the commercial possibilities has been made in collaboration with interested organisations or parties.

6.16. In their reply, the C.S.I.R., have stated that "As a research organisation, the National Botanic Gardens has found the feasibility of commercial cultivation of Plantago Ovata (Isabgol) on saline alkaline soil (usar) and it has been widely publicised. National Botanic Gardens has estimated that seed and husk of Plantago Ovata, worth about Rs. 2.00 crores, are exported every year."

6.17. The Committee desired to know whether the CSIR are satisfied about the commercial viability of the process developed by the National Botanical Gardens for production of rose oil and whether any plans have been drawn up for its commercial exploitation. In their reply, the CSIR have informed the Committee that "The National Botanic Gardens is satisfied about the commercial viability of the process and the apparatus developed for extraction of Rose oil from Rosa damascena or Damask Rose. The yield of oil by this method is (0.03—0.04 per cent)—double that by the other methods—and the quality of the oil has been evaluated by a foreign firm to be of international standard. The N.B.G. is negotiating with certain firms for the production and supply of the rose oil based on NBG's know-how. The trials at NBG have further shown that Rose damascena can very well be grown on saline alkaline (usal) soils. The process has been accepted for the grant of a paint."

6.18. The Committee asked about the efforts made by the National Research Development Corporation or the Council of Scientific and Industrial Research to get the process developed by the National Botanical Gardens, for preparation of raisens from different varieties of grapes, commercially exploited, and state whether liaison is being maintained with the Minister of Foreign Trade in regard to this process and other such processes so as to facilitate a correct formulation of import policy with regard to items of imports covered by CSIR's research efforts.

6.19. The Committee have been informed that the work has been done on laboratory scale and the process has since been patented. Further work is in progress. The Ministry of Foreign Trade and Supply have constituted different Export Promotion Councils on which the national laboratories are represented. This has been done with a view to facilitating formulation of import policy with regard to items of imports covered by CSIR's research efforts. The Ministry have recently asked for our representations on the Central Co-ordinating Committee appointed by them to look into the work done by the different Research and Development Cells. Action in this regard is being taken.

6.20. The Committee feel that the working of the drug farms run by C.S.I.R. needs to be greatly improved.

6.21. Over the last six years ending 1968-69, three of these farms at Jammu, Kashmir and Halwani have run up a deficit of Rs. 18.70 lakhs, as their receipts have consistently fallen short of their recurring expenses.

6.22. The area available has also not been fully cultivated. Taking the farm at Haldwani, for instance the area under cultivation in 1969 was 95 acres as against the total area of 250 acres. The yield has also been coming down, as would be evident from the data given in the Audit paragraph.

6.23. The Committee would like the C.S.I.R. to take steps to make these farms self-sufficient units. As the purpose of these farms is to demonstrate to outside cultivators the feasibility of growing of certain medicinal and other plants on a commercial scale, it is essential that these farms should be considered as commercial units and made to work as such. It is also imperative that the C.S.I.R. should maintain close contact with the Forest Department in various States to whom project reports on the important items of production in the farms should be circulated. A time-targetted programme should be drawn up for this purpose, covering the principal products grown in the farms.

6.24. The Committee note that the National Botanic Garden is stated to have successfully cultivated plantago ovata. It has been estimated that seed and husk of this product worth about Rs. 2 crores are being exported every year. The Committee desire that the National Botanic Gardens should make all efforts to promote commercial cultivation of this plant.

6.25. The Committee note that the National Botanic Gardens have also developed a process for production of rose oil which is reported to be in demand in the international perfumery market. The commercial viability of the process should be established and the question of undertaking its production thereafter considered.

Institute of Bio-Chemistry and Experimental Medicine, Calcutta.

Audit Paragraph

6.26. For construction of six-storey building for the Indian Institute of Bio-Chemistry and Experimental Medicine, a plot of land measuring 3.82 acres was acquired in 1958 at Jadavpur (Calcutta) for Rs. 4.04 lakhs. Rs. 1.04 lakhs were spent on levelling and dressing of that land.

6.27. Laying of pile foundations capable of sustaining the six-storey building was completed in 1960 at a cost of Rs. 6.12 lakhs. The construction work was awarded to a contractor early in 1961 at an estimated cost of Rs. 24.20 lakhs. In October 1962, however, when two storeys of the building had been completed and Rs. 16.52 lakhs spent, further construction was abandoned because of financial stringency, and as the area in which the building was being constructed was congested and the land acquired for staff quarters was not sufficient. It was also decided that the Institute be shifted to Kalyani which is 49 Km. from Calcutta. To that

end 39 acres of land were purchased there from the West Bengal Government for Rs. 10.02* lakhs in September, 1963. Approval of the Finance Sub-Committee/Governing Body of the Council or the Ministry of Finance to the purchase was not obtained. The Ministry of Finance, who were requested in December, 1963 to approve the expenditure, declined to do so on the ground that the question of establishment of the Institute at Kalyani had not been considered by the Finance Sub-Committee of the Council.

6.28. An expert committee appointed subsequently by the Council to go into the whole question recommended that shifting of the Institute to Kalyani was inevitable. The Governing Body of the Council accepted the recommendation in September 1964. Construction at Kalyani has, however, not yet been started and the land is still lying vacant (December 1968).

6.29. The full quantity of steel for the Institute's building (at Jadavpur) upto four storeys had been purchased during 1961 and 1962. Consequent on the decision in October 1962 not to proceed further with the construction, 151.65 tonnes of steel became surplus. No steps were taken immediately to dispose of the surplus steel. 27.15 tonnes were subsequently used for other purposes. As the balance steel, whose book value was Rs. 87,700, had lost its strength due to prolonged storage since 1961—63, it was disposed of by public auction in July 1968 for Rs. 62,700 only. For disposing of that steel, Rs. 7,200 were also spent on advertisement, testing and agency charges. Loss of Rs. 32,200 was thus sustained in disposal of the steel.

6.30. For housing the research and other staff of the local laboratories including this Institute, the Council also acquired in 1960 two plots of land measuring 2.98 and 4.02 acres for Rs. 14.58 lakhs. Although eight years have passed, construction of staff quarters in one of the two plots (value Rs. 5.43 lakhs) is still in a preliminary stage as only the piling work has so far been awarded to the contractors (February, 1969).

[Paragraph 118 of Audit Report (Civil), 1969]

6.31. The Committee desired to know how the congestion at Jadavpur in which the building was to be constructed or the insufficiency of the land acquired for staff quarters escaped the notice of the Council before acquiring land. The Council of Scientific and Industrial Research have in the written reply stated :

> "It is not always possible to foresee the likely congestion in a particular area that may take place in future. In this particular case, the land for the building of the Institute at Calcutta was acquired in 1958 whereas after a lapse of 5 years the thinking was that the Institute should have a bigger area which was taken from the West Bengal Government in Kalyani.

*Out of Rs. 10·02 lakhs, Rs. 1·63 lakhs are still to be paid to the State Government (December, 1968).

6.32. As regards insufficiency of land for the staff quarters, it may be mentioned that the availability of land in nearby localities in Calcutta is scarce. In order to tide over the difficulty, we decided to go in upto 11 storeyed construction. In fact in one of the plots, such tall structures have already been constructed although the nearby buildings are not even half as tall as ours."

6.33. With regard to the increase in expenditure on construction, the CSIR have stated that "the construction work was awarded for 4 storeys for Rs. 23.95 lakhs against the estimated cost of Rs. 24.20 lakhs for a 4 storeyed structure and not for 6 storeys. The piling work was undertaken on the basis of construction of 6 storeys as originally proposed. However, due to National Emergency in 1962, the scope of construction was reduced to two storeys only with an expenditure of Rs. 16.52 lakhs."

"Since the floor areas of all the four floors requirements were not identical the cost per floor is not proportionate to the total cost. Further, the lower floors have to carry heavy load of upper floors and hence lower floors are costlier than upper floors. Further, certain items of work had to be undertaken consequent on the reduction of the scope of construction, with a view to proper utilisation of the area for research purposes. The main extra items of work were (i) parapet walls all round; (ii) lean concrete to project the dowel column bars from corrosion; (iii) lime terracting; (iv) additional partitions and consequent strengthening of RCC slabs and associated items like doors, fittings etc., in order to make more rooms in the restricted floor area. Due to these technical requirements the cost of two floors appears to be not proportionate with that of 4 floors. This apparent excess will be set off when future construction of upper storeys is taken up."

"No compensation was paid to the building contractors due to reduction in the scope of work (from four to two storeys). The first two storeys of the building are complete and the Indian Institute of Experimental Medicine is functioning in the building."

6.34. The Committee asked how the value of the land at Kalyani was fixed and why the approval of the Finance Sub-Committee/Governing Body of the Council or the Ministry was not obtained. In their written reply, the CSIR have stated :

> "The land at Kalyani belonged to the West Bengal Government and the sale price was fixed by them *Ex-post-facto* approval of the Governing Body, CSIR, was obtained in September, 1964. The Ministry of Finance also concurred in the proposal in December, 1964."
>
> "The Expert Committee recommended the location of the Institute at Kalyani and the Governing Body endorsed the recommendations at its meeting held in September, 1964."

"On account of Pakistani aggression, National Emergency was declared in 1965 and no construction work was taken up there. Subsequently, there was re-thinking as to whether the land at Kalyani should be utilised for the Institute or returned to the State Government. The matter was considered by the Executive Council of the Institute at their meeting held on 22nd September, 1969, and the conclusion reached was that the Institute does no require the land at Kalyani."

6.35. The Committee desired to know the reasons for delay of six years in disposing of the surplus steel after the decision has taken to proceed with the construction of building. In a written reply, the CSIR have informed the Committee that—

"The two storeyed building of the Institute was completed in 1962. On account of National Emergency and cut on budget outlay of the CSIR, the building work was stopped rendering the steel surplus. Besides, there was some re-consideration of the question of shifting the Indian Institute of Experimental Medicine to Kalyani in September, 1963. An Expert Committee to look into the shifting of the Institute was constituted. The Expert Committee recommended the shifting of the Institute to Kalyani and the Governing Body endorsed the recommendation in September, 1964. However, in view of Pakistani aggression in 1965, construction was abandoned. Before disposing the surplus steel, every effort was made for its utilisation in other National Laboratories. It was the normal practice that materials like steel which were not freely available a few years ago had to be stored for the timely execution of the work. However, during 1965-66, action for the disposal of steel rods was initiated after ascertaining the strength of the rods from the National Test House, Calcutta. As the other Laboratories/Institutes did not require the steel for utilisation in their works, the DGS&D was approached in January 1968 to dispose of the same by public auction."

6.36. The Committee asked for the reasons for delay in starting construction on one of two plots acquired for housing the research and other staff of the local laboratories. In a written reply, the CSIR have stated that "The construction of staff quarters in the national laboratories/institutes is considered keeping in view the budget allocation. Due to National Emergencies in 1962 and 1965 and the resultant cut in budget provision, priority was given to those works on which work had already begun. Besides, construction of new quarters was undertaken at a limited number of places. Hence construction of quarters at Anwar Shah Road site could not be started earlier.

The latest position is that pile work for construction of 148 multi-storeyed apartments is almost complete and tenders for super-structure are being invited in a few days time."

6.37. The Committee are distressed at the vacillation that occurred on the question of housing the Indian Institute of Bio-chemistry and Experimental Medicine. In 1958 a plot measuring 3.82 acres was acquired at Jadavpur for construction of a six-storey building. In October, 1962 after two storeys were completed, the construction work was stopped, partly because of financial stringency and partly because there was a re-thinking on the subject. After an Expert Committee examined the question of location of the Institute, it was decided to shift the Institute to Kalyani and for that purpose a plot of land measuring 39 acres was purchased from the Government of West Bengal for Rs. 10.02 lakhs. No building was constructed on this land and in September, 1969, the Executive Council of the Institute reversed the earlier decision. The result is that an amount of Rs. 10.02 lakhs has remained blocked in the land at Kalyani.

6.38. Another unsatisfactory feature of the case is that there was a delay of about six years in disposing of steel acquired for the construction at Jadavpur which became surplus. This resulted in a loss of Rs. 32.200.

Utilisation of Grants-in-aid paid to the Council (Headquarters)

Audit Paragraph

6.39. Out of Rs. 6.06 crores paid as grants during 1958-59 to 1966-67, audited statements of accounts for Rs. 1.56 crores were awaited on 23rd September 1968:—

Year	No. of cases in which grants were paid	Total amount of grant paid (in lakhs of rupees)	No. of cases in which audited accounts not received	Amount for which audit certificates are awaited (in lakhs of rupees)
1958-59	384	26·87	54	2·40
1959-60	572	46·76	86	4·91
1960-61	690	43·33	126	6·49
1961-62	981	60·11	165	5·14
1962-63	1158	71·14	199	5·59
1963-64	1952	76·54	595	23·39
1964-65	2071	92·69	628	23·30
1965-66	2036	91·22	797	30·75
1966-67	2012	96·94	1128	54·29
TOTAL	11856	605·60	3778	156·26

[Paragraph 3 of Audit Report on the accounts of CSIR for 1966-67]

6.40. The Committee desired to be furnished with information on the following points:—

(i) the tyes of institutions to which these grants are paid and whether these are registered institutions;

(ii) whether there are rules approved by the Governing Body for determining the eligibility of institutions for these grants and the quantum of grants to each;

(iii) how the Council regulate and correlate the grants-in-aid with the assistance with the institutions might be receiving from State Governments, voluntary organisations and international bodies;

(iv) before sanctioning the grants how the Council satisfies itself about the capacity, financial and otherwise of the Institutions;

(v) whether the Council evaluates the performance of these institutions and keep a continuous watch over it and if so, in what manner. What criteria are adopted for selecting schemes/public institutions and what the normal frequency of such an evaluation is;

(vi) whether the Council keeps a proper watch over receipt of audited statements of accounts, utilisation certificates, statement of permanent and semi-permanent assets created out of grants, performance reports etc., from the grantee institutions.

6.41. In a written reply, the CSIR have given the following information seriatim:

"(i) The C.S.I.R. gives grants-in-aid to

(a) Universities;

(b) Research and technological institutions/organizations/associations;

(c) Colleges;

(d) Government institutions (in respect of Emeritus/Retired Scientists grant only); and

(e) Laboratories attached to an industrial establishment.

Grants are given by the CSIR only to corporate and registered institutions.

(ii) C.S.I.R. sanction grant to scientists of standing, working in the institutions enumerated at (i) above on the recommendation of Research Committees/Executive Councils, which are duly approved by the Governing Body of the C.S.I.R.

The quantum of financial assistance for each research project is determined on the basis of recommendations by Research Committee concerned.

Research fellowships are also sanctioned tenable at the institutions listed at (i) above, to suitable persons on the recommendation of duly constituted Export Committees.

(iii) & (iv) C.S.I.R. gives grant-in-aid to Scientists of standing in the field for enabling them to undertake a particular research investigation. The grant is thus sanctioned for a specific purpose. The question of correlating these grants to other income of the institutions does not therefore arise.

Research fellowships are sanctioned on merits to duly sponsored applicants by the institutions listed at (i) above.

(v) The grant is sanctioned by the C.S.I.R. to the Scientists in their individual capacity, having regard to their standing, the nature of the project/investigation in the field of research. Research Fellowships are sanctioned to enable promising young persons qualified to benefit from full-time training in methods of scientific research. Periodical progress reports in respect of research schemes are obtained and submitted to the Research Committees concerned for evaluation of work and renewal of grant. Progress reports in respect of research fellows are also obtained for a proper appraisal of the work done during a particular period.

Institutes, etc., through which payments are made, are merely the agencies for purposes of maintenance of accounts and day-to-day administration.

(vi) In accordance with the 'Terms and Conditions for CSIR Fellowships and Research Grants', Universities/Institutes, etc. receiving the grants from the Council have to maintain separate accounts for each scheme/Research Fellow. This is audited by the authorised audit authority of the Institute etc. (in most of the cases by the A.G. concerned) Audit Statements of Accounts and Utilization Certificates are required to be submitted by the Institutes concerned to the CSIR in the usual manner. Receipt of the audited Statements of Accounts/Utilization Certificates is watched by the CSIR. A separate Inventory is maintained by the Institutes concerned in respect of purchases made out of the CSIR grant."

6.42. The C.S.I.R. have given the following position of outstanding utilisation certificates as on 31st January, 1970:

Year	No. of cases in which grants were paid	Total amount for which grant was paid (fig. in lakhs)	No. of cases in which audited amounts have not yet been received	Figures in lakhs
1958-59	384	26·87	41	1·88
1959-60	572	46·76	58	2·31
1960-61	690	43·33	18	6·08
1961-62	981	60·11	145	4·33
1962-63	1158	71·14	111	2·85
1963-64	1952	76·54	443	19·80
1964-65	2071	92·69	341	12·87
1965-66	2036	91·22	603	21·13
1966-67	2012	96·94	708	29·36
			2568	100·70

6.43. In reply to question whether in cases where audited accounts received, the Council was satisfied that the grants-in-aid are fully utilized and the objectives of the grants were attained and there is no wasteful expenditure, the CSIR have stated: "The Research Committees keep a watch on the progress of work in each research scheme. They also ensure that grants are properly utilised to secure the best results. Research Committees periodically hold symposium/convention in a particular subject of topical importance to consider (i) review of the current state of knowledge on the subjects which come within the purview of a Committee, and (ii) provide a platform for active research workers to present the details of investigation conducted, or proposed to be conducted. These symposia/conventions also help in conducting a proper survey of the research findings.

6.44. The Audit Officer also certifies while furnishing the Utilization Certificates that the grant was utilised specifically for the purpose it was sanctioned."

6.45. The Committee are concerned over the heavy accumulation of outstanding utilisation certificates in respect of grants issued by CSIR. As on 31st January, 1970, there were 2,568 outstanding cases involving grants amounting to Rs. 100.70 lakhs pertaining to the years 1958 to 1966-67,

for which utilisation certificates were outsanding. Forty-one of these cases involving an amount of Rs. 1.88 lakhs date back to 1958-59. The Committee would like the CSIR carefully to examine the reasons for this heavy accumulation of arrears and obtain the wanting certificates expeditiously.

Outstanding Recoveries of Testing Fees

Audit Paragraph

6.46. The rules of the Council provide that fees in respect of services rendered by the Laboratories/Institutes of the Council to Government Departments and outside Bodies should be recovered in advance. It was, however, noticed that in respect of ten institutions no advance was taken and a total sum of Rs. 1.03 lakhs was outstanding for recovery on 31st March, 1966, Year-wise details for the amount outstanding and the amounts due by Government Departments and other Bodies are given below:—

	Govt. Departments	Other Bodies
	Rs.	Rs.
Upto 1963-64	3,873	5,974
1964-65	1,931	8,000
1965-66	18,786	64,834
TOTAL . .	24,590	78,808

[Paragraph No. 3 of Audit Report on the accounts of CSIR for 1965-66.]

6.47. In written reply the C.S.I.R. have informed the Committee that "the normal practice followed by the various National Laboratories/Institutes was to recover the testing fees in advance from non-Government Institutes. Testing fees from Government Departments and Undertakings used to be recovered on completion of the work as Government Departments experienced difficulties in paying such fees in advance. According to the latest information received from the laboratories/institutes, recovery of Rs. 6,888.77 was outstanding on account of testing fees in January, 1970."

"The recoveries of testing charges are made in accordance with the schedule of charges approved by the Executive Council of the concerned laboratory/institute."

6.48. About the testing facilities extended by the National Physical Laboratory, the Estimates Committee in praragraph 73 of its 103rd Report

(1965-66) had observed that the income derived from testing and certification was less than 10 per cent of the annual expenditure incurred on them, and that the schedule for testing charges which was laid down by the laboratory several years ago had not been revised. The Committee had recommended that the testing charges should be fixed in such a manner as would make them commensurate with the expenditure incurred in this behalf, consistently, of course, with what the industry could bear and that the charges should be reviewed periodically. The Committee have been informed that: "The recommendation of the Estimates Committee made in para 73 of the 103rd Report (1965-66) were brought to the notice of the National Physical Laboratory (NPL) who intimated that new schedule of testing fees is being brought into force.

"The Executive Council of the N.P.L. at its meeting held on 26th August, 1966, considered the revised schedule of testing fees which had been prepared by the laboratory taking into account the time taken in carrying out various tests together with the cost of any special equipment which may have to be fabricated for testing one particular item only. The cost of item tested was also taken into consideration. Several items particularly those which were to be used as standards by the industries and the disproportionate increase in the testing fee which was likely to effect adversely the developing industries will still require to be tested on specially subsidised basis was also taken into account by the Executive Council. It was also proposed to the Executive Council that the fees may be reviewed after one year and a decision taken whether the new fees should be retained, revised further or brought down in the interest of scientific research and industry.

"The Executive Council approved the revised schedule of testing charges subject to the provision that the fees were not less than those of the National Test House. On the other hand, this should be a little higher.

"The recoveries of testing charges are, generally speaking, made in accordance with the schedule of charges approved by the Executive Council of the laboratory/institute concerned from time to time.

"The testing fees are determined taking into accounts the following factors:

(i) Salary of the Scientific Staff.
(ii) Electric and other service charges.
(iii) Depreciation cost of instrument/equipment.
(iv) Overhead and miscellaneous charges.

"It may, however, be mentioned that only special tests for which facilities at the existing institutions are not available, are undertaken at the national laboratories provided they do not interfere with the normal work of the laboratories."

6.49. The Kane Committee made the following observations in regard to revenue derived by laboratories for sponsored work:

> "Discussions at the Laboratories confirmed the earlier conclusions that the revenue earned by the CSIR Laboratories was insignificant and bore little relation to the expenditure. There are a few notable exceptions like the earnings from know-how on Baby food by the CFTRI. Some Directors have also submitted estimates of substantial future earnings. Time alone will show whether these expectations will be realised. Even in the cases where trials were carried out by the C.S.I.R. Laboratories on their testing units for the benefit of their parties, the charges levied were a fraction of the actual expenditure. Examples of this are the fees charged by the CFRI to test the washability of coals and by the NML to test ores or the strength of metal and alloys. The Committee was informed, however, that the fees charged by the CLRI not only covered costs but also contributed to overheads."

6.50. The Committee find that on 1st January, 1970, a sum of Rs. 6,888 was outstanding for recovery from Government departments and outside bodies in respect of services rendered by the laboratories/institutions of the CSIR.

6.51. While the Committee appreciate that in case of Government Departments and undertakings there is difficulty in recovering the testing fees in advance it is not clear why there should be outstandings against outside bodies. The Committee desire that the CSIR should issue necessary instructions to the laboratories for recovering testing fees in advance from non-Government institutions.

6.52. The Committee would also like the CSIR to ensure that the testing fees chargeable by the various laboratories are periodically reviewed so that they cover the expenditure actually incurred by the laboratories on the provision of these services. This is necessary in view of the findings of the Kane Committee that charges for testing prescribed by certain laboratories constitute only "a fraction of the actual expenditure".

Delay in adjustment of advances

Audit Paragraph

6.53. According to the books of the various Laboratories/Institutes of the Council a sum of Rs. 189.91 lakhs was outstanding on 31st March, 1966 due to delay in the adjustment/refund of advances. This includes advances made to (i) subordinate officers for meeting petty expenditure (Rs. 3.32 lakhs) and (ii) to outside bodies/Government Department

(Rs. 156.36 lakhs) for purchase of machines, equipment and stores. Details in respect of a sum of Rs. 30.23 lakhs were not available with the Council. The Council, however, stated (June, 1967) that further adjustment of Rs. 29.64 lakhs was made upto 31st May, 1967, leaving a balance of Rs. 160.27 lakhs. The table below indicates the year-wise details of outstanding unadjusted balances as on 31st May, 1967.

Year Upto	Amount (in lakhs of rupee
1958-59	0·37
1959-60	0·21
1960-61	0·62
1961-62	2·44
1962-63	3·51
1963-64	27·62
1964-65	42·33
1965-66	52·94
Amount for which details are not known	30·23

(Paragraph 4 of Audit Report on the accounts of CSIR for 1965-66)

6.54. The Committee desired to know the reasons for the delay in adjustment of advances and the present position. In a written reply, the CSIR have stated, "Out of the outstanding amount of Rs. 160.27 lakhs, a sum of Rs. 91.28 lakhs was outstanding in January, 1970 in the Laboratories/Institutes' Objection Books for the period from 1958-59 to 1965-66.

"The major amount under Objection Book pertains to the payments made to Pay and Accounts Officer, D.G.S. & D., Customs authorities, Stationery Office, State Government/Public Undertakings and certain private parties etc. for purchase of equipment, raw materials etc. Laboratories/ Institutes have been instructed to keep these advances under constant watch and take necessary action for their adjustments."

6.55. The Committee are not satisfied with the progress made in adjustment/refund of outstanding advances paid by the various laboratories/ institutes of the CSIR. The books of the various laboratories/institutes of the CSIR show a sum of Rs. 189.91 lakhs as outstanding for adjustment as on 31st March, 1966 for the period 1958-59 to 1965-66. Out of this, a sum of Rs. 91.28 lakhs was still outstanding in January, 1970. The Committee desire that vigorous steps should be taken to adjust or recover these outstanding advances expeditiously, as with the lapse of time, there is likelihood of these advances becoming irrecoverable.

Construction of Scientific Museum

Audit Paragraph

6.56. At the request of the Council 30 acres of land were made available by Bombay Municipal Corporation in January, 1964 for construction of a scientific and industrial museum in Bombay. Possession of 28.2 acres of land was given to the Council in January, 1964 but there ware squatters on the land. Possession of the remaining 1.8 acres which form the front portion and provide the only entry to the entire area is yet to be obtained. In the meantime the Council has spent Rs. 90,000 on the pay and allowances of the Staff engaged between February 1964 and May 1968 in order to watch closely and followup the day-to-day progress of the Court cases for removing squatters on the land.

Paragraph 2 of Audit Report on the accounts of CSIR for 1966-67]

6.57. In a note, the C.S.I.R. have informed the Committee as follows:

'The land was allotted by the Government of Maharashtra to the CSIR free of cost.

"It was the responsibility of the Bombay Municipal Corporation to remove the squatters from the land. Possession of 28.2 acres out of 30 acres allotted to the CSIR, was taken subject to clearance of squatters. They were removed from the site but subsequently, on humanitarian grounds, they were again permitted under orders of the State Government to occupy the land.

"One U.D.C. and 4 Chowkidars are at present deployed at Mafatlal Scientific & Technological Museum, Bombay to avoid further encroachment of the land. As stated, it is the responsibility of the State Government to remove the squatters from the land. However, a sum of Rs. 1,19,101.36 p. has been spent by the CSIR on M.S.T.M., Bombay upto 1968-69 as per the details given below:—

	Rs.
1964-65	34,784·03
1965-66	18,802·64
1966-67	26,712·46
1967-68	24,480·73
1968-69	14,381·50
	119,101·36

6.58. The Committee are not happy over the delay in construction of a scientific and industrial museum in Bombay. The land for the purpose was allotted by the Government of Maharashtra to the CSIR free of cost as early as January, 1964, but it has been under occupation of squatters. Although the squatters were once removed from the site, subsequently on humanitarian grounds they were again permitted under the order of the State Government to occupy the land. In the meantime the CSIR have incurred an expenditure of Rs. 1.19 lakhs on the staff deployed at the site to avoid further encroachment of land. The Committee would like the question of removal of squatters to be vigorously pursued with the State Government. Alternatively, the CSIR might consider the question of acquiring another piece of land for this purpose.

ATAL BIHARI VAJPAYEE,
Chairman,
Public Accounts Committee.

NEW DELHI;
April 29, 1970
Vaisakha 9, 1892 (*Saka*).

APPENDIX

Summary of main conclusions/Recommendations

S. No.	Para No.	Department/Ministry concerned	Conclusions/Recommendations
1	2	3	4
1	1·9	Education and Youth Services (Council of Scientific and Industrial Research)	The Committee are perturbed over the increase in the establishment expenditure of C.S.I.R. Over the period 1963-64 to 1967-68, the expenditure on this account (including contingent expenditure) increased from Rs. 3.98 crores to Rs. 7.41 crores. The increase was particularly marked at the headquarters office where the expenditure jumped from Rs. 28.71 lakhs to Rs. 47.26 lakhs during this period. These figures leave little room for doubt that there has been a proliferation of non-research activities in the organisation. An Expert Committee which was set up to review the Fourth Plan programmes of the C.S.I.R. drew pointed attention to this phenomenon when they observed that "the considerable growth in non-research activities of the CSIR" is "consuming a sizeable proportion of the available resources."
2	1·10	–do–	How greatly the non-research staff outnumber the research staff in the organisation would be clear from the figures furnished to the Committee. 30 out of 34 establishments run by C.S.I.R. (in respect of which data has been provided to the Committee) had a total staff of 13,466 in 1968-69.

			Of this, scientific staff accounted for 3360, or about 25 per cent of the total staff, the balance being accounted for by auxiliary, administrative and class IV staff. The last category of staff alone accounted for about 30 per cent of the total number.
3	I.11	–do–	In the absence of a definite distinction in the organisation between scientific, technical and administrative posts, it is clear that the proportion of scientific staff actually employed is even less than that disclosed by the foregoing analysis. The Committee of Enquiry have pointed out that in C.S.I.R. "quite often persons have been given scientific designations in divisions concerned with purchase, stores, publicity, publications, library information etc., when, from an analysis of their work and record, it would appear that they are clearly performing administrative/technical tasks." That Committee observed that this had been done because scientific posts "carry comparatively higher salaries and....because creation of administrative posts requires the concurrence of the Financial Adviser which is not necessary for scientific posts." It is obvious that if the posts are "classified strictly on a functional basis", as suggested by that Committee, it would be found that the organisation carries a larger number of non-research staff than available figures suggest.
4	I.12	–do–	The Committee are left with the impression that neither the C.S.I.R. nor the laboratories have made any sustained efforts to control the expenditure on establishment. The Committee of Enquiry drew attention to "several cases where posts were created without due scrutiny" and also to the fact that "on some occasions posts were created to provide higher

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			pay to existing incumbents." This, coupled with the tendency to classify non-research staff as scientific staff thereby extending to them "certain special benefits apparently intended for scientists engaged in research" has tended to push up the establishment expenditure of the organisation.
5	1.13	Education & Youth Services (CSIR)	The C.S.I.R. is an Institution meant for conducting application-oriented research. It is, therefore, essential for the organisation to ensure, as pointed out by the Expert Committee, on Fourth Plan, that "other activities should not be allowed to grow at the expense of this primary function." To achieve this, the Committee would suggest action on the following lines: (i) There should be a reclassification of the posts in the organisation by "a broad-based Committee', as suggested by the Committee of Equiry, so that only persons actually engaged on research constitute the scientific staff. (ii) Strict financial discipline should be observed in the creation of new posts and some guidelines provided to the laboratories as to the proportion of scientific staff to the rest of the staff. The C.S.I.R. have formulated some norms in this regard—1 research worker for 3 supporting technical and administrative staff—but it should be examined whether this could be tightened up further.

			(iii) The proportion of class IV staff is quite obviously high. Further recruitment in this category should be stopped and the scope for absorbing this staff, by suitable vocational training, examined. The Committee note that a start in this regard has been made.
6	1.19	-do-	The Committee are surprised that the recommendations of the Third Reviewing Committee of the C.S.I.R. for establishing four units at the CSIR's headquarters to strengthen industrial liaison should have been construed to mean that these units should be on the pattern of national laboratories with their own Executive Councils. The Finance Sub-Committee of CSIR had specifically desired in 1965 that this proposal should be placed as a separate item before the Governing Body of the CSIR. This was not done and the proposal was merged with Fourth Plan proposals with the result that it never come up specifically for consideration by the Governing Body. The result was that there was an expansion in staff strength at headquarters ranging from 18 per cent to 933 per cent. The Committee note that it has since been decided that the Directorates should form part of the Headquarters establishment and function as division without Executive Councils or the powers enjoyed by the Directors of National Laboratories.
7	1.20	-do-	The Committee have earlier in this Report referred to the proliferation of staff in the CSIR. This case illustrates what proportions this phenomenon has assumed. The Committee would like the CSIR to make an immediate assessment of the extent of surplus staff and transfer their services to other needy organisations.

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8	2.11	Education & Youth Services (CSIR)	The Committee are of the view that the CSIR, which was set up with a chain of laboratories to serve as the premier centre for applied industrial research in the country, has failed to establish adequate rapport with industry. The expenditure on this organisation since the beginning of the Plans has amounted to Rs. 146.76 crores* but the returns on this investment have been meagre.
9	2.12	-do-	How isolated the organisation is from the country's industrial milieu and how feeble its impact on industrial production would be evident from the findings in a later section of this Report. The Kane Committee expressed the view that facilities created in the national laboratories located near industrial centres have remained unused by industries, despite representation of industrial interests on the Executive Councils of the laboratories, scientific sub-committees, Advisory Panel etc. As an illustration of this situation, they cited the National Metallurgical Laboratory at Jamshedpur, where not a single pilot project was sponsored by the steel industry in that area. On the other hand the industry preferred to develop its own research centres on a large scale.
10	2.13	-do-	It is not only the commercial sector which has remained aloof from the laboratories. The Kane Committee pointed out that "there was considerable reluctance even by Government Departments to sponsor research at the national laboratories." The Central Fuel Research Institute was set

			up in close proximity to the Sindri Fertilisers which, however, preferred to establish its own planning and development department. The Kane Committee found "little liaison" between these two research units in their work.
11	2.14	-do-	The Committee are aware that this situation is not entirely of CSIR's making. But it would appear that the organisation has not been sufficiently responsive to the needs of industry. As early as 1965, it organised a 'get-to-gether' with industry, as a result of which 168 priority research projects were formulated. 40 of these projects were "already in progress" at that time and another 11 were dropped. The remaining 117 are stated to have been referred to the laboratories "for giving high priority": apparently they are yet to get under way.
12	2.15	-do-	Following a suggestion made at the meeting of the Governing Body of the C.S.I.R. in November, 1967, a Committee was set up "to consider measures for bringing industry and science close to each other." This Committee is yet to finalise its report.
	2.16	-do-	The Committee feel that the existing situation is most unsatisfactory, as it has led to the laboratories functioning in a vacuum. Urgent remedial measures are called for and the Board of Scientific and Industrial Research and the Governing Body of the C.S.I.R. should promptly move in the matter. The Committee have later in the Report made certain suggestions in this regard.

Vide p.63: Supplementry Agenda for the 60th meeting of C.S.I.R. (May, 1969).

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13	2.28	Education & Youth Services (CSIR) Industrial Development	The Committee feel that there is need for revamping the research programmes of laboratories so as to bring them in tune with the priorities arising out of the country's developmental plans. A Committee set up to review the Fourth Plan proposals of the C.S.I.R. took note of the general feeling that "some of the research laboratories had undertaken programmes over a wide range of subjects and that there was great scope of regulating the research programmes in the light of national priorities." If this is to be sucessfully achieved, the Committee feel that there should be close and continuous contact between the CSIR and organisations like the Planning Commission and the Director General of Technical Development. A suggestion worth consideration in this context is the proposal made by the Administrative Reforms Commission that the administrative control over CSIR should be shifted to "such a position as will ensure a continuous dialogue between CSIR laboratories and their user industries." The Committee note that this suggestion is already receiving Government's attention.
14	2.29	-do-	In any plan for re-orienting research work in the laboratory, the Committee feel that the needs for import substitution and export promotion should receive major emphasis. This would be facilitated only if the Director General, Technical Development keeps in close contact with the organisation and refers to the laboratories specific proposals in the field.

15	2.30	Education & Youth Services (CSIR)	No less important in the Committee's view is the need to ensure that the research efforts in the laboratories centre round new techniques, as a complaint often made against the laboratories is that they are "either re-discovering or re-inventing known processes or products." The Committee have examined this issue in relation to pilot projects in the laboratories later in this Report.
16	2.31	-do-	Another point that has come to the Committee's notice is the overlap in research between laboratories. The data given earlier in this Report would show that in as many as eight disciplines, there were two, three and in one case even eight laboratories whose work overlapped. A certain amount of overlap is perhaps inevitable in any research effort, but the matter calls for constant and continuous review.
17	3.9	Education & Youth Services (CSIR)/ Industrial Development	The Committee have in paragraph 1.11 of their Seventy-Fifth Report (Fourth Lok Sabha) already emphasised the need for ensuring that foreign collaborations are not approved in fields where indigenous know-how has developed adequately. The Committee note that Government have streamlined the arrangements in this regard to ensure that if a know-how suitable for commercial exploitation has been developed in the C.S.I.R. laboratories, foreign collaboration is not permitted.
18	3.10	-do-	The Committee would like to point out that the C.S.I.R. on its part has an obligation to establish the commercial viability of processes developed in its laboratories, while urging its cause before the Foreign Investment Board. Later in this Report, the Committee have referred to the experience of Bharat Electronics which undertook the production of cera-

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			mic capacitors based on know-how developed in National Physical Laboratory but found the process "so unworkable and uneconomic" that it was obliged belatedly to seek foreign collaboration. The Mudaliar Committee on foreign collaborations also referred to complaints that "C.S.I.R. has not been taking a broad view regarding the availability of indigenous know-how" and had pressed "cases where the indigenous know-how is restricted to the laboratory stage or its commercial possibilities had not been fully proved." It is, therefore, essential that processes developed in the laboratories are adequately proved with the help of competent design and consultancy services available.
19	4 15	Education & Youth Services (CSIR)	The C.S.I.R. is an institution meant for conducting applied industrial research. The Committee, therefore, feel that success in its work will have to be judged by the extent to which the processes developed in its laboratories find application in industry. On this criteria, it must be said that the Institution's achievements so far have been very modest.
20	4·16	-do-	The position in this regard would be evident from the data regarding utilisation of the results of research in the laboratories which has been furnished by the C.S.I.R. As on 1st April, 1967, 135 processes developed in the laboratories and released to various parties were in production (some of them on a token scale), as against which 95 other released processes had not gone into production, 23 of them since 1964 or even earlier

years. Another 240 processes developed in the laboratories had found no takers. The position does not seem to have improved in subsequent years as would be seen from the data given in this section of the Report.

21 4.17 -do- To what extent the laboratories made a dent on industrial production could be estimated from the fact that the value of the products turned out by the processes released amounted to Rs. 453 lakhs in 1966-67, as against the national industrial output of about 5,000 crores and an expenditure of Rs. 146.76 crores incurred by C.S.I.R. on its activities since the First Plan started.* These figures speak for themselves.

22 4.18 -do- The fact that a large number of processes have not gone into production indicates that research efforts in the laboratories lack proper direction and are carried on without regard to the needs and requirements of industry. This is a very vital deficiency which calls for immediate correction. A closer tie-up with industry while formulating and implementing research programmes in the laboratories is very clearly indicated.

23 4.19 -do- The Committee would like to mention two instances to illustrate the position regarding utilisation of processes developed in the laboratories. In one case, Vitamin 'C', for the production of which a process was worked out in the National Chemical Laboratory between 1959 and 1961, is yet to go into production, though it was licensed for production by Hindustan Antibiotics in 1965. Production is now expected to begin by 1971, but, in the meanwhile, a private company, which entered the field in 1962, with

*Supply Agenda for the 60th meeting of the Board of Scientific & Industrial Research (May, 1969—page 63).

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			a capacity of 60 tons, is now producing 120 tons. In the other case, ceramic capacitors developed by National Physical Laboratory was taken up for production by Bharat Electronics. The process was, however, found "unworkable and uneconomic" and, therefore, the undertaking was obliged to obtain know-how from abroad for this purpose.
24	4.20	Education & Youth Services (CSIR)	In view of the very poor record of utilisation of processes developed in the laboratories, the Committee would like to suggest that the Board of Scientific and Industrial Research should in future carry out as a regular feature systematic review of the performance of each of the laboratories from the point of view of their contribution to industrial production. The review should initially cover laboratories where the record of utilisation has been particularly poor: the causes for this phenomenon should be isolated and appropriate correctives applied. To facilitate a standing review, a standardised form of reporting by the laboratories should be adopted and this should provide for each laboratory reporting on the number of processes under development, the period over which development has taken place, the number developed and leased and the production established in the commercial sector on the basis of those processes and the number developed but awaiting release. The collection of data on these lines and its systematic processing would help the C.S.I.R. to understand how far research efforts in the laboratories have relevance to the needs of industry.

25	4·39	Education & Youth Services N.R. D.C	In the Committee's view, one reason for the unsatisfactory utilisation of processes developed in the C.S.I.R. laboratories is the inadequacy of the National Research Development Corporation, the agency through which the processes are released. At the last meeting of the governing body, the Vice-President of C.S.I.R. expressed the view that "there is considerable dissatisfaction" that the present procedure for release of processes "are involved and take considerable time" and that "the working of this organisation needs looking into."
26	4·40	-do-	The data given in this section of the Report would show that the activities of the Corporation have been on a very modest scale. The Corporation was patterned on the lines of a similar organisation set up in U.K. Whereas its counterpart in U.K. sponsored a number of developmental projects in collaboration with industry and has been functioning as a channel for development of a significant number of inventions emanating from the commercial sector, the Corporation in India has not been able to build up a very satisfactory liaison with industry in the country so far. Upto 31st March, 1969, the total number of processes referred to the Corporation from private individuals was 26 out of which only one process has been licensed and is in production. As for developmental projects, the Corporation has since its inception sponsored 21 schemes of which only one was a joint venture with industry. It is obvious that the Corporation has yet to forge organic links with industry, without which it is not likely to have any great degree of success even in its efforts to get enterpreneurs to take up processes developed in the laboratories. The Committee note that the Board of the Corporation has been reconstituted and that steps are being

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			taken to streamline the arrangements for industrial liaison. They hope that this would bring about an improvement in the performance of the organisation.
27	4·41	Education & Youth Services N.R.D.C.	The Committee would also like the Corporation to evolve some rational criteria for fixation of royalties on processes released to industries. In a very profitable line of production like Television receivers, for instance, the recurring royalty has been just 2 per cent of ex-factory sales. This return must be considered meagre when it is weighed against royalty rate of 5 per cent to 10 per cent allowed to foreign parties from whom know-how is generally acquired in the country on collaboration basis. The matter, in the Committee's opinion, needs re-examination.
28	4·42	Education & Youth Services (CSIR)	Elsewhere in this Report, the Committee have drawn attention to the lack of cost consciousness in the C.S.I.R. laboratories which undertake pilot projects. The Committee have in paragraph 1:7 of their Seventy-Fifth Report (Fourth Lok Sabha) stressed the need for introduction of a general pattern of cost analysis in the laboratories with a view to ascertaining the expenditure incurred on processes meant for commercial exploitation. The Committee note that while this has been generally "welcomed", action to implement it is yet to be taken. The Committee desire that this should be done forthwith.

29	4.43	Education & Youth Services (CSIR)/NRDC	The Committee would also like to reiterate their recommendation in paragraph 1.20 of their Seventy-Fifth Report that processes not developed within a reasonable time should be resumed and framed out to other reliable parties.
30	4.46	Education & Youth Services (CSIR)	The Committee feel that one reason for the gap between industrial research carried out in the C.S.I.R. laboratories and its utilisation is that laboratories lack experience in scaling-up operation essential for establishing the commercial viability of process proved on a laboratory scale. If this gap is to be bridged, it is essential that the laboratories should take the help of competent technical consultants in industry before embarking on developments of processes beyond the laboratory stage.
31	4.50	-do-	The Committee are of the view that applied industrial research can thrive and its results put to fruitful use only if the industry has a stake in the research work. From this point of view it is essential that research ventures should be organised in collaboration with industry. The data available suggests that in U.K. in pursuance of the deliberate policy of Government the number of cooperative research associations has increased. From 20 such associations in 1939, the number increased to 50 by 1960. A start in this regard has been made in India with the organisation of a number of cooperative Research Associations, in league with industry. The pace should be accelerated.
32	5.5	-do-	In the Committee's opinion, the performance of 'pilot plants' set up in the C.S.I.R. laboratories has been most unimpressive. By 1968 there were over 155 such pilot plants in existence or under construction and the investment in them amounted to over Rs. 9.6 crores. A Committee set

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			up by the C.S.I.R. (Kane Committee), which reviewed the working of these plants found that very "few of the processes" developed through pilot plants had been commercially exploited and that the revenues earned by the laboratories "have been disproportionately small" in relation to the expenditure and effort that went into these ventures.
33	5·6	Education & Youth Services (CSIR)	The data given to the Committee shows that over 70 per cent of the expenditure on pilot plants was incurred by five laboratories. Two of these laboratories, the Regional Research Laboratory, Hyderabad and the National metallurgical Laboratory, Jamshedpur, alone spent over Rs. 2 crores on two pilot plants—one on a coal gasification project and the other on a low-shaft furnace plant. In the first case, the gas produced has not found any use nor its quality been tested, while in the other, as reported by the Kane Committee, "not a single low shaft furnace has been established in the country for production of pig iron with know-how obtained from this plant." It is interesting to note that these pilot plants have been in existence for eight to ten years.
34	5·7	-do-	A Working Group appointed by the C.S.I.R. to finalise the Fourth Plan proposals found that 21 projects in the laboratories were serving no useful purpose and suggested that they should be discontinued. The investment in these projects has not been intimated to the Committee by the C.S.I.R., which, incidentally is yet to take a final decision on these projects (though the Working Group reported as early as December, 1968. This, in the

35	5·8	–do–	Committee's view, suggests that projects which involve substantial investments are not being processed with due care.
36	5·9	–do–	Yet another aspect of these pilot plants is the fact that some of them were what the Kane Committee characterised as "attempts at rediscovery" of "processes already well known elsewhere, sometimes within the country itself". The Committee gave at least six instances of such pilot plants. The investment in two of them amounted to Rs. 4:90 lakhs; data in regard to others has not been furnished. The data furnished to the Committee also shows that the pilot plants in some cases continued even after indigenous production in the commercial sector had been established on the basis of know-how obtained from elsewhere. The Kane Committee cited two such cases—one involving production of cryolite in the National Metallurgical Laboratory and the other relating to vanadium pentoxide catalyst at the National Chemical Laboratory. The Committee are left with the impression that the laboratories concerned showed no appreciation of the developmental needs of the industry for whose benefit the pilot projects were meant.
37	5·10	–do–	By far the greatest drawback, in the Committee's opinion, about the pilot projects in the laboratories is that they were initiated without enlisting the participation of the industry. As these plants were meant to demonstrate the commercial feasibility of processes, the entrepreneur interested in its development should have been located and his identification with the project secured. Instead, as pointed out by the Kane Committee, "the search for the sponsor began after the investigations were completed and

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rarely succeeded." The Committee consider it extraordinary that an institution like the C.S.I.R., whose job is to encourage application-oriented research should have proceeded about its projects in this fashion. The Committee feel that the C.S.I.R. should now take stock of the position in regard to pilot plants and tighten the procedures for the clearance and establishment of these projects. This should be secured by the following steps:

(i) All proposals for establishment of pilot plants should receive the most searching scrutiny. Approval should be given only if the product or the process involved is new or the know-how involved is a secret held by a few firms which it would be worth-while to disseminate.

(ii) No proposal should be ordinarily approved without a sponsor from industry or Government and to encourage investment by the concerned interests, the laboratories should consider giving performance guarantees, as is reported to be done by the National Chemical Laboratory.

(iii) A pilot plant should not be allowed to drag on indefinitely, as its very purpose, *i.e.*, the demonstration of the viability of a process would be defeated thereby. The C.S.I.R. should, therefore, prescribe an outside time-limit for the completion of these projects.

(iv) The findings in a later section of the Report would show that some laboratories have showed very little cost-consciousness while implementing pilot plants. Pilot plants under such circumstances become a self-defeating exercise. The estimates for these projects should be most carefully drawn up and costs strictly controlled.

(v) The C.S.I.R. should set up immediately competent appraisal teams as suggested by the Kane Committee to review the existing plants. This should be done within a prescribed time-limit and projects not found to be useful should be scrapped, so that further time and money are not expended on them.

38	5.16	Education & Youth Services (CSIR).	The Committee disapprove of the fact that the Regional Research Laboratory, Jorhat proceeded with the setting up of a vertical kiln plant contrary to a decision of the governing body of C.S.I.R. that the feasibility of the project should be investigated first. The Committee would like to be apprised of the explanation of the laboratory for this extraordinary course of action and the steps being taken by C.S.I.R. to ensure that cases of this type do not recur. It should also be examined how the laboratory found funds for this project, when it had not been approved by C.S.I.R.
39	5.17	-do-	The magnesium plant at the National Metallurgical Laboratory, Jamshedpud is an instance of a pilot plant undertaken in haste, without adequate investigation into its cost aspects. In the result, the project which was initially estimated to cost Rs. 57.73 lakhs will now cost Rs. 1.27 crores. The Committee feel that laboratories doing applied work should show a

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			better sence of awareness of the cost of their work *vis-a-vis* expected benefits. The Committee have made some suggestions on this point elsewhere in the Report.
40	5·43	Education & Youth Services (CSIR)	In the Committee's opinion, the coal gasification project started at Hyderabad, is a glaring example of mismanagement, culminating in waste of public funds given for scientific research.
41	5·44	-do-	In the first place, there was a confusion about the objectives of the Project. As pointed out by the Kane Committee, it was "never clear whether the plant was to be established to produce synthesis gas for production of ammonia or industrial and domestic gas to be supplied to the city of Hyderabad". As initially approved, the project envisaged the installation of a continuously operating plant that would produce synthesis gas or equivalent fuel gas. In successive revisions of the estimates for the project that thereafter occurred, provision was made for additional units which were necessary only for a scheme which envisaged supply of town gas or industrial gas. However, items like distribution lines, gas meters, burners etc., which were essential for such a scheme were left out. Moreover, in the final estimate there was no provision even for a conversion unit without which, according to the Kane Committee, production of synthesis gas was also not possible.

42	5.45	-do-	In the second place, the estimates for the project were not drawn up with care, with the result that by stages the cost escalated from Rs. 21 lakhs to Rs. 1.89 crores. How faulty the estimating was would be evident from the fact the first estimates were approved before the laboratory had even ascertained the cost of the equipment from the suppliers.
43	5.46	-do-	Thirdly, the equipment that was ordered was a semi-commercial scale unit of a type which had been successfully developed for commercial operation overseas. If the idea of the project was to study gasification characterstics of coal, a smaller plant on a laboratory scale might have sufficied. The C.S.I.R. have themselves admitted that "instead of choosing the step of developing a gasification process *de novo* and proving it on a small plant and taking it on to an intermediate scale pilot plant, the other alternative of buying an itermediate scale plant based on the best know-how available.....was chosen." It is clear therefore that the project was undertaken on a much larger scale than necessary.
44	5.47	-do-	Fourthly, orders for the imported equipment were placed shortly before a large-scale revision of estimates, which raised its cost from Rs. 45.50 lakhs to Rs. 189 lakhs, took place. This was not prudent, as it committed the CSIR irretrievably to the project.
45	5.48	-do-	In the fifth place, a pilot plant involving such a substantial investment was proceeded with, without securing the association of prospective users of the process with the venture.

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46	5.49	Education & Youth Services (CSIR)	Lastly, due to a failure of co-ordination, the fact that a similar pilot plant had been successfully commissioned in another laboratory, escaped notice both at the time the project was sanctioned and at a subsequent stage when the revised estimates were approved. It is regrettable that when the equipment with that laboratory was capable of being used for the purposes of this venture, orders were unnecessarily placed for a similar equipment for this project.
47	5.50	-do-	The cumulative result of all these lapses has been an infructuous expenditure of Rs. 35.12 lakhs with further commitments to the tune of Rs. 33.38 lakhs. Costly equipment imported for the project lies unpacked with the danger of its being rendered absolutely useless.
48	5.51	-do-	The Committee would like a comprehensive investigation to be made into the case to pin-point responsibility. Steps should also be taken forthwith for the disposal of the equipment, if there is no further use for it, so as to avoid further losses.
49	5.68	-do-	The Committee are dissatisfied with the working of this pilot plant. It has been in operation for over a decade during which the expenditure on it has amounted to over Rs. 1.32 crores. The bulk of the expenditure (Rs. 96.71 lakhs) was on recurring expenses for which detailed estimates were not prepared before the project was sanctioned. The overseas firm

			which supplied the equipment (cost Rs. 20 lakhs) had recommended a process for its operation which the laboratory did not find suitable under Indian raw material conditions.
50	5·69	-do-	The Plant was set up to establish the suitability of low-shaft furnaces for production of pig iron from locally available ores in various States. A variety of ores have been tested but the results have not been satisfactory either in terms of cost or quality of the end product. The cost has amounted to Rs. 1,447 per tonne, against which the product has been sold at Rs. 310 per tonne. It has been stated that "the technique evolved by the laboratory can be exploited commercially", but the Committee are sceptical about this claim, in the absence of any assessment in this regard by expert engineering and design consultants familiar with the problems of scaling-up of operation.
51	5·70	-do-	Another significant feature of the operation of this plant is that, expert for one state, which contributed towards investigation expenses to some extent, none of the other (13) States sponsored work on this project. Consequently the laboratory has had to carry out the work on its own, while the prospective user remained dissociated from it.
52	5·71	-do-	A working Group constituted by the CSIR recommended that this project should be scrapped. Thereafter, an Expert Committee on Pilot Plants (Kane Committee) set up by the CSIR pointed out that the Plant has "found no useful application." "So far", that Committee stated, "not a single low-shaft furnace has been established in the country for production of pig iron with know-how obtained from this Plant."

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53	5·72	Education & Youth Services (CSIR)	Taking all the foregoing considerations into account, the Committee feel that it would not be wise to continue this pilot plant any longer. The matter should be remitted for an immediate decision by the Board of Scientific and Industrial Research.
54	5·79	-do-	The Committee feel that there has been avoidable delay in implementing this project which could be a potential foreign exchange conserver. The proposal for a pilot plant was put up for approval sometime in 1964, but it was not finally approved till 1966. Thereafter, the Heavy Electricals, who were to supply a transformer needed for operating this plant delayed the supply by a year.
55	5·80	NRDC	The Committee note that the commercial feasibility of the process has been established by a study conducted by a firm of engineering consultants as well as the Central Engineering and Designing Organisation, C.S.I.R. Necessary 'upscaling operations' to corroborate these findings are stated to be in progress. These should be expeditiously compleed and the N.R.D.C., which is stated to have offers from certain interested parties should also finalise the arrangements for leasing out of the process.
56	5·84	Education & Youth Services (CSIR)	The Committee are distressed over the delay in recovering a sum of Rs. 5.79 lakhs spent between March, 1964 to March, 1969 for electing a Plant in the premises of a firm at Kandla for imparting technical know-how

			to it for the manufacture of Potassium Chloride and Epsom Salts from mixed salt. In spite of the fact that the Plant has been commissioned from Apr. 1966 and that there was a clear understanding with the firm that, on its satisfactory completion, the plant would be transferred to the firm at cost price plus payment of royalty, the terms and conditions of the transfer and the question of recovery of the cost of the Plant and the quantum of royalty payable by the firm still remains to be settled. The Committee desire that the matter should be settled with the firm withour further delay.
57	6.20	-do-	The Committee feel that the working of the drug farms run by C.S.I.R. needs to be greatly improved.
58	6.21	-do-	Over the last six years ending 1968-69, three of these farms at Jammu, Kashmir and Haldwani have run up a deficit of Rs. 18.70 lakhs, as their receipts have consistently fallen short of their recurring expenses.
59	6.22	-do-	The area available has also not been fully cultivated. Taking the farm a Haldwani, for instance, the area under cultivation in 1969 was 95 acres as against the total area of 250 acres. The yield has also been coming down, as would be evident from the data given in the Audit paragraph.
60	.23	-do-	The Committee would like the C.S.I.R. to take steps to make these farms self-sufficient units. As the purpose of these farms is to demonstrate to outside cultivators the feasibility of growing of certain medicinal and other plants on a commercial scale, it is essential that these farms should be considered as commercial units and made to work as such. It is also

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			imperative that the C.S.I.R. should maintain close contact with the Forest Department in various States to whom project reports on the important items of production in the farms should be circulated. A time-targetted programme should be drawn up for this purpose, covering the principal products grown in the farms.
61	6.24	Education & Youth Services (CSIR)	The Committee note that the National Botanic Garden is stated to have successfully cultivated plantago ovata. It has been estimated that seed and husk of this product worth about Rs. 2 crores are being exported every year. The Committee desire that the National Botanical Gardens should make all efforts to promote commercial cultivation of this plant.
62	6.25	-do-	The Committee note that the National Botanic Gardens have also developed a process for production of rose oil which is reported to be in demand in the international perfumery market. The commercial viability of the process should be established and the question of undertaking its production thereafter considered.
63	6.37	-do-	The Committee are distressed at the vacillation that occurred on the question of housing the Indian Institute of Bio-chemistry and Experimental Medicine. In 1958 a plot measuring 3.82 acres was acquired at Jadavpur for construction of a six-storey building. In October, 1962 after two storeys were completed, the construction work was stopped, partly because of financial stringency and partly because there was a rethinking

			on the subject. After an Expert Committee examined the question of location of the Institute, it was decided to shift the Institute to Kalyani and for that purpose a plot of land measuring 39 acres was purchased from the Government of West Bengal for Rs. 10.02 lakhs. No building was constructed on this land and in September, 1969, the Executive Council of the Institute reversed the earlier decision. The result is that an amount of Rs. 10.02 lakhs has remained blocked in the land at Kalyani.
64	6.38	do	Another unsatisfactory feature of the case is that there was a delay of about six years in disposing of steel acquired for the construction at Jadavpur which became surplus. This resulted in a loss of Rs. 32,200.
65	6 45	do	The Committee are concerned over the heavy accumulation of outstanding utilisation certificates in respect of grants issued by CSIR. As on 31st January, 1970, there were 2,568 outstanding cases involving grants amounting to Rs. 100.70 lakhs pertaining to the years 1958 to 1966-67, for which utilisation certificates were outstanding. Forty-one of these cases involving an amount of Rs. 1.88 lakhs date back to 1958-59. The Committee would like the CSIR carefully to examine the reasons for this heavy accumulation of arrears and obtain the wanting certificates expeditiously.
66	6 50	do	The Committee find that on 1st January, 1970, a sum of Rs. 6,888 was outstanding for recovery from Government departments and outside bodies in respect of services rendered by the laboratories/institutions of the CSIR.

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67	6.51	Education & Youth Services (CSIR)	While the Committee appreciate that in case of Government Departments and undertakings there is difficulty in recovering the testing fees in advance it is not clear why there should be outstandings against outside bodies. The Committee desire that the CSIR should issue necessary instructions to the laboratories for recovering testing fees in advance from non-Government institutions.
68	6.52	do	The Committee would also like the CSIR to ensure that the testing fees chargeable by the various laboratories are periodically reviewed so that they cover the expenditure actually incurred by the laboratories on the provision of these services. This is necessary in view of the findings of the Kane Committee that charges for testing prescribed by certain laboratories constitute only a "a fraction of the actual expenditure".
69	6.55	do	The Committee are not satisfied with the progress made in adjustment/refund of outstanding advances paid by the various laboratories/institutes of the CSIR. The books of the various laboratories/institutes of the CSIR show a sum of Rs. 189.91 lakhs as outstanding for adjustment as on 31-3-1966 for the period 1958-59 to 1965-66. Out of this, a sum of Rs. 91.28 lakhs was still outstanding in January, 1970. The Committee desire that vigorous steps should be taken to adjust or recover these outstanding advances expeditiously, as with the lapse of time, there is likelihood of these advance becoming irrecoverable.

70	6·58	do	The Committee are not happy over the delay in construction of a scientific and industrial museum in Bombay. The land for the purpose was allotted by the Government of Maharashtra to the CSIR free of cost as early as January, 1964, but it has been under occupation of squatters. Although the squatters were once removed from the site, subsequently on humanitarian grounds they were again permitted under the order of the State Government to occupy the land. In the meantime the CSIR have incurred an expenditure of Rs. 1.19 lakhs on the staff deployed at the site to avoid further encroachment of land. The Committee would like the question of removal of squatters to be vigorously pursued with the State Government. Alternatively, the CSIR might consider the question of acquiring another piece of land for this purpose.

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