

**ESTIMATES COMMITTEE
(1967-68)**

TWELFTH REPORT

(FOURTH LOK SABHA)

MINISTRY OF DEFENCE

**DEFENCE RESEARCH AND DEVELOPMENT
ORGANISATION**



**LOK SABHA SECRETARIAT
NEW DELHI**

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C O R R I G E N D A

TO

Twelfth Report (Fourth Lok Sabha) of
Estimates Committee on the Ministry
of Defence - Defence Research and
Development Organisation.

- Page (i), Chapter IV - D,
for 'Criterion' read 'Criteria'.
Page (i), Chapter IV - E,
for 'Loboratories' read 'Laboratories'.
Page (iv), under XXV, for 'publication'
read 'publications'.
Page (viii), line 1, for 'Science'
read 'Sciences'.
Page 4, in the Table, for 'hana'
read 'Ghana'.
Page 5, line 5 after the 1st Table,
for 'cuntry' read 'country'.
Page 10, line 16, for 'Engineer'
read 'Engineering'.
Page 12, line 11, for 'Engineer'
read 'Engineering'.
Page 15, line 14, for 'Service'
read 'Services'.
Page 16, line 18, for 'Science'
read 'Since'.
Page 18, line 8, for 'hold'
read 'held'.
Page 20, line 23, for 'Pshychological'
read 'Psychological'.
Page 21, line 6, for '.' read ','.
Page 29, line 20, for 'refferred'
read 'referred'.
Page 33, line 2, insert 'be'
after 'not'.
Page 37, line 27, for 'Lab.'
read 'Laboratory'.

- Page 38, line 18, for '.' read ',','.
Page 39, last line, for 'exists'
read 'exist'.
Page 42, line 5, for 'Ihas' read 'has'.
Page 46, line 8 from below, for
'Lectures' read 'lectures'.
Page 47, line 17, for 'whese'
read 'where'.
Page 52, line 9, delete '.' after
'Junior'.
Page 52, line 12, for 'labouratory'
read 'laboratory'.
Page 66, column 3 of the 1st Table,
for 'Thruhg' read 'Through'.
Page 66, line 7 from below, for 'filed'.
read 'filled'.
Page 68, item 3rd from below in the
Table, for 'Informtion' read 'Information'.
Page 69, line 16, for 'quit' read 'not'.
Page 73, line 6, for 'Phase VI'
read 'Phase I'.
Page 76, line 13 from below, for
'shedule' read 'schedule'.
Page 82, line 19, for 'he' read 'the'.
Page 83, line 23, for 'eronautical'
read 'aeronautical'.
Page 83, line 28, for 'an' read 'and'.
Page 84, line 4, for 'purchase'
read 'purchased'.
Page 84, line 14 from below, for
'necessis-' read 'necessi-'.

Page 85, line 13, insert 'of'
after 'total cost'.
Page 85, line 15, for 'Laboratory
and their air conditioning to house
instruments and (b)' read 'Laboratory,
were awaiting installation till the
middle of 1966 pend-'.
Page 85, line 19, for 'instaallation'
read 'installation'.
Page 87, line 7, for 'seientific'
read 'scientific'.
Page 87, line 6 from below,
for 'informmation' read 'information'.
Page 87, line 5 from below,
for 'faacilities' read 'facilities'.
Page 90, line 11 from below, for
'down' read 'done'.
Page 90, line 10 from below, for
'labouratory' read 'laboratory'.
Page 92, line 2 from below, for
'wouds' read 'wounds'.
Page 93, line 7, for 'Physology'.
read 'Physiology'.
Page 93, line 12 from below for
'Participated' read 'participated'.
Page 95, line 2, for 'ncces-'.
read 'neces-'.
Page 117, line 5 from below, for
'evaluatng', read 'evaluating'.
Page 120, line 7, for 'ciptal'
read 'capital'.
Page 190, line 32, for 'model
constitution' read 'Model Constitution'

Page 191, lines 20 and 25, for
'model constitution', read 'Model
Constitution'.

Page 205, line 27, for 'model
constitution' read 'Model Constitution'.

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(1967-68)

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INTRODUCTION

I, the Chairman, Estimates Committee having been authorised by the Committee to submit the Report on their behalf, present this Twelfth Report on the Ministry of Defence—Defence Research and Development Organisation.

2. The subject was examined by Sub-Committee on Defence of the Estimates Committee (1966-67) and necessary information obtained and evidence taken by them. The Committee, however, could not finalise their report due to the sudden dissolution of the Lok Sabha on the 3rd March, 1967. The Sub-Committee on Defence of the Estimates Committee (1967-68) have perused the minutes of evidence and have come to their own conclusions which have been approved by the main Committee and have been embodied in the Report.

3. The Sub-Committee on Defence of the Estimates Committee (1966-67) took the evidence of the representatives of the Ministry of Defence on 18th, 19th, 22nd, 23rd, 24th and 25th November, 1966. The Committee wish to express their thanks to the Scientific Adviser to the Minister of Defence; Secretary, Ministry of Defence (Department of Defence Production); Chief Controller, Research and Development, and other officers of the Ministry for placing before them the material and information they wanted in connection with the examination of the estimates.

4. The Committee wish to extend their thanks to Brigadier K. Pennathur, Director, National Productivity Council; Dr. D. S. Kothari, Chairman, University Grants Commission, Dr. S. Husain Zaheer, former Director General, Council of Scientific and Industrial Research; Dr. R. S. Varma of Delhi University; Dr. B. D. Nagchaudhuri Director, Saha Institute of Nuclear Physics, Calcutta; Shri J. C. Kapoor, President and Chief Executive Officer, Air-conditioning Corporation Ltd., Calcutta; and Dr. Y. A. Fazalbhoy, Managing Director, General Radio and Appliances Ltd., Bombay for giving evidence and making suggestions to the Committee.

5. The Committee wish to thank Dr. J. S. Chatterjee of Jadavpur University for making useful suggestions to the Sub-Committee on Defence of the Estimates Committee during their visit to Calcutta. The Committee also wish to thank Dr. S. Dhawan, Director,

Indian Institute of Science, Bangalore; Dr. Amarjit Singh, Director, Central Electronics Engineering Research Institute, Pilani, and Major General B. D. Kapur (Retired) for furnishing memoranda to the Committee.

6. The Report was considered and adopted by the Sub-Committee on the 18th July, 1967 and finally adopted by the whole Committee on the 24th July, 1967.

7. A statement showing the Analysis of Recommendations contained in the Report is also appended in Appendix XXXII.

NEW DELHI;

July 26, 1967.

Sravana 4, 1889 (Saka).

P. VENKATASUBBAIAH,
Chairman,

Estimates Committee.

CHAPTER I

INTRODUCTORY

A. Role of Science and Technology

The importance of Science in national development and planning was recognised by Indian leaders and eminent men of Science long before Independence. In 1939, the Indian National Congress appointed a National Planning Committee and invited leading scientists, economists and others to participate in the formulation of plans of economic development and social betterment. A study group dealt with the problem of General Education, Technical Education and Scientific Research. This group, besides other suggestions, recommended that the programmes of industrial and educational developments should be closely linked with the programmes of scientific research. Further, it emphasised that various sectors of the latter should be closely coordinated. The late Prime Minister (Shri Jawaharlal Nehru) always emphasised the importance of scientific outlook and the need for the utilisation of science in the solution of problems facing the country. Soon after Independence, Prime Minister Nehru, with unflinching faith in science, declared:

“.....It is science alone that can solve the problem of hunger and poverty, of insanitation and illiteracy, of superstition and deadening custom and tradition, of vast resources running to waste, of a rich country inhabited by starving people.....”

Who indeed could afford to ignore science today? At every turn we have to seek its aid..... The future belongs to science and to those who make friends with science.....”

Since Independence, the Government took an active role in encouraging research in the universities and establishing a chain of research laboratories. The significance attached to scientific research in independent India could be judged from the creation of a Ministry of Scientific Research and Natural Resources directly under the Prime Minister.

In March, 1958, the Indian Parliament passed the historic Scientific Policy Resolution thus accepting science as the key to economic

progress. The resolution recognised the vital role of science in national development and committed the Government to take measures for the rapid growth of science. The text of the resolution is reproduced in Appendix I.

Science and technology are two closely related concepts. Science can show the possibility of something happening it cannot make it happen. It needs technology to achieve what may be indicated as possible. It is technology backed by strong science that helps produce material things which India badly needs. Science produces knowledge, technology helps produce wealth.

Delivering his first major speech on Scientific Policy after assuming office, the late Prime Minister Shri Lal Bahadur Shastri said:

"In bringing about the social revolution science and technology are of utmost importance, but still more important, as stressed in the Scientific Policy Resolution, is the spirit, will and determination of the people to bring about this revolution. Gandhiji, through his unique example and dedication, strengthened the resolution of the people to fight for and achieve political freedom. We need something of the same spirit of selflessness and dedicated service, if we are to bring about an economic and social transformation in this great country of ours.

But science and technology, if they are to play their proper role in the progress of our country, must be intimately linked to the life and work of the common man in the country. Science must not, therefore, be confined to the ivory tower or encased within the walls of big buildings and big laboratories; it should be carried to the factories and more so to the fields and to the farms, and to the remote villages."

B. Research and Development.

2. During the last 15 years, and particularly since the beginning of the Third Five Year Plan, increasing attention is being given to certain aspects of science and technology, namely, scientific research and development, which is called briefly, Research and Development or R&D. Research, consisting of basic research and applied research, is described as systematic, intensive study directed towards fuller scientific knowledge of the subject studied. The Scientific Adviser to the Minister of Defence in his evidence accepted the dictionary

definition of research as "Study undertaken to discover new knowledge" and development as "The process of bringing a specific item to maturity."

The Zuckerman Committee in their report on "The Management and Control of Research and Development" stated that Research and Development specifically carried out for Defence can be divided into three broad categories: "basic research, applied research and development." During the evidence, the Scientific Adviser stated that so far as Defence R&D is concerned he would recommend this classification for adoption from simplicity point of view and bearing the Indian conditions in mind.

C. Basic and applied research

3. The aim of basic research is to seek fuller knowledge or understanding of the subject studied, and publication of results is essential. Applied research is directed towards the practical application of the results of basic research and, when successful, would lead to development which is directed towards the production of useful material devices and methods, including the design and development of prototypes and processes.

The Scientific Adviser stated during evidence that no precise figures of proportion of total defence research and development in terms of money and manpower devoted to basic research, applied research and development were available. However, as a result of a study conducted about a year ago by choosing three representative laboratories of the Defence Research and Development Organisation it might be said that the average proportion may be 5 per cent in basic research, 35 per cent in applied research and 60 per cent in development. He was of the view that what needed to be encouraged and protected in the defence research was basic research. It would provide opportunities for intellectual satisfaction also.

D. Expenditure on scientific research in India

4. Expenditure incurred in India on scientific research and development has increased very rapidly having more than doubled during each five year period of the last 15 years of planning. It has been estimated that about Rs. 230 crores had been incurred during the 15 year period of the three previous five year plans. At a rough estimate the R&D expenditure in the last year of the three previous plan periods was about Rs. 8 crores, Rs. 25 crores, Rs. 60 crores respectively; and is likely to be about Rs. 100 crores or so at the end of the Fourth Plan.

The Education Commission in its Report (1966) states: "In the modern world, scientific research constitutes a fundamental activity of a nation, vital to its progress, intellectual morale and well-being." The close inter-action between expenditure on research and development and the level of per capita Gross National Production as in 1960 is apparent from the following Table:

Country	Expenditure on re- search and develop- ment (1960)		GNP Dollars per capita
	Percentage of GNP	Dollars per capita	
U.S.A.	2·8	78·4	2308·0
U.S.S.R.	2·3	36·4	..
U.K. (1961)	2·7	35·4	1146·0
France	2·1	27·0	1026·0
Sweden	1·6	27·0	..
Canada	1·2	21·9	1408·0
W. Germany	1·6	20·0	1115·0
Switzerland	1·3	20·0	1463·0
Netherlands	1·4	13·5	859·0
Norway	0·7	10·0	..
Luxembourg	0·7	9·3	..
New Zealand	0·6	8·9	1317·0
Belgium	0·5	7·5	1030·0
Japan	1·6	6·2	404·0
Hungary	1·2	..	..
Poland	0·9	5·3	..
Australia	0·6	5·3	1239·0
Italy	0·3	1·8	623·0
Yugoslavia	0·7	1·4	223·0
China	..	0·6	..
hana	0·2	0·4	198·0
Lebanon	0·1	0·3	..
Egypt	..	0·3	138·0
Philippines	0·1	0·3	200·0
India	0·1	0·1	69·0
Pakistan	0·1	0·1	54·0

Source:—Taken from Underdeveloped Science in Underdeveloped Countries, Stevan Dedijer, Minerva Autumn, 1963.

The Commission has further observed:

“The current level of expenditure on research and development in India is about one rupee *per capita*, nearly 0.3 per cent of GNP. It will be seen that India is almost at the bottom end of the international ladder R&D effort expressed as a percentage of the GNP”.

The Defence research expenditure, as a percentage of total National Budget and as a percentage of Gross National Product for U.S.A., U.K., U.S.S.R., and India during the year 1963-64 is given in the following table:

Country	Defence Expenditure		Defence R & D Expenditure
	As percentage of total National Budget	As percentage of Gross National Product	As percentage of Defence Budget
U.S.A.	56	11.3	15
U. K.	30	7.0	15
U.S.S.R.	52	2.2	15
India	38.2	5.4	1

In their 94th Report presented to Lok Sabha during 1966 the Committee had observed that ‘although over the past 6 years there has been a considerable build up, yet the total magnitude of Defence R&D effort falls far short of the defence needs of the country today. The defence R&D effort in this country with its budget of the order of about 9 crores, constitutes a very small fraction of the total national and defence budgets’. The Committee had accordingly recommended that to make defence research really effective and useful, the budget allotment for research should be augmented to the extent required for reaching the take-off stage.

The table below furnished by the Ministry of Defence gives the expenditure incurred during the last 4 years and the foreign exchange component and expansion of scientific manpower:

Year	Total Expenditure (Rs. in lakhs)	Foreign Exchange (Rs. in Lakhs)	Strength of technical personnel (Gazetted)
(1)	(2)	(3)	(4)
1962-63	5,24.01	56.39	1061
1963-64	7,36.14	68.81	1136
1964-65	8,39.32	103.72	1165
1965-66	9,73.10	90.34	1193
1966-67	11,40.27	93.22	..
	(upto March Final)		

In the course of oral evidence the Scientific Adviser has stated that it will be the effort of Defence R&D Organisation to consolidate the build-up that has been done over the past seven years and not to go in for creating new establishments. He has added that the thirty and odd establishments cover practically every area of defence science and if there is any area which is not covered it could easily be fitted into one of the existing establishments. There is no need to create a new establishment and create new problems about space, buildings and so on. During the next 5 years they contemplate to set up only one Naval Establishment for research and development work needed for the Navy.

The Committee are glad to note the steady growth of expenditure on Defence Research and Development over the past 6 years. They would, however, like to emphasise that allocation of funds alone would not give better results; it is also necessary that whatever funds may be provided should be purposefully utilised. Viewed from this angle, the Committee appreciate the decision of the Defence Research & Development Organisation to consolidate the existing achievements before embarking on expansion programme.

CHAPTER II

DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION

A. Origin and Growth of Defence Research and Development Organisation

5. The impact of science and technology on warfare has been and continues to be, so enormous and pervasive that attention to science and technology has become a matter of vital concern to defence in every country today. National defence at the present time calls for the total mobilisation of the country's scientific resources and also its industrial potential. It has been stated by the Ministry that there has got to be a separate Research and Development Organisation within the defence set-up in view of the fact that the demands which defence makes on scientific research are different from civilian demands in character, objectives, approach and other aspects. It has also been stated that defence research and development work is of critical importance because modern weapons systems are becoming increasingly complex, sophisticated and costly and are liable to rapid obsolescence because of the pace of scientific and technical development.

In India the beginnings of the application of science and technology for defence purposes go back to the thirties, when, for specific purposes of purchase of stores and equipment, certain test laboratories were raised. Technical units, known as Inspectorates, had existed from a much earlier date alongside ordnance factories, but they were concerned almost wholly with inspection of factory out-turn.

The shift of the Second World War to the Eastern theatre brought in its wake technical problems connected with procurement, maintenance, storage, preservation and, to some extent, modification of equipment and stores to suit local conditions and utilisation of indigenous materials. This led to the growth of laboratories and technical establishments, particularly in the army sector, to meet specific needs. By mid-forties these units had started on reorganisation and expansion. Defence Science as such was, however, practically non-existent in India and a modest beginning was made in 1948, when alongside the technical units of the Services, a nucleus Defence Science Organisation was set up.

Various steps were considered by Government from time to time to institute adequate machinery for providing direction and control to defence R&D effort under the Ministry of Defence. As early as 1949, therefore, the Defence Science Policy Board and Defence Science Advisory Committee were constituted concurrent to the formation of Defence Science Organisation in the Ministry of Defence. The Defence Science Policy Board was a high power body comprising all the three Services Chiefs, Financial Adviser, Secretary, Ministry of Defence and the Scientific Adviser apart from late Dr. Bhatnagar, Dr. Bhabha and Dr. K. S. Krishnan. A copy of the Ministry of Defence Office Memorandum No. 555-M/Cord(A) dated the 22nd January, 1949 laying down the composition and functions of the Board is given in Appendix II. Similarly, the Defence Science Advisory Committee had Principal Staff Officers of the three Services apart from representatives of C.S.I.R. among its members. Both these bodies, however, did not function effectively and they virtually pass into oblivion over a long period and became defunct with the formation of the Defence Production Board in 1955.

The Defence Production Board itself was reorganised in 1957. Three Committees, viz. the Defence Production Advisory Committee, Defence Production and Supply Committee and the Defence Research and Development Committee were constituted as the main organs of the Defence Production Board. The Defence Research and Development Committee which was primarily concerned with direction and control of Defence R&D effort had under it a number of panels covering a wide range of defence R&D activity.

With the creation of Defence Research and Development Organisation in its present form in 1958, the Defence R&D Committee of the Defence Production Board was dissolved. Instead, the Defence Minister's Scientific Research and Development Committee was formed in April 1958 and a Defence Research and Development Advisory Committee constituted in May, 1958. The latter, however, became ineffective over a period of time primarily due to the inability of 6 eminent scientists to attend its meetings and therefore after holding a couple of meetings, the Committee more or less ceased to function. Finally in April, 1962, the Defence Research and Development Council and Defence Research and Development Executive Committee were constituted to provide direction and control to defence R&D effort.

Present set-up of the R & D Organisation

6. By late fifties, the need for further reorganisation and expansion of defence research and development, as well as of production

and inspection activities, became increasingly manifest. The level, scope and tempo of research and development had to be raised to meet the defence needs of independent India. The next major re-organisation was effected in 1958 when a new organisation, the Defence Research and Development Organisation, was formed, initially by amalgamating the Defence Science Organisation with some of the then existing technical development establishments of the Army and the Directorate of Technical Development and Production (Air). The new organisation was administratively separate from, but otherwise complementary to, the organisation for defence production and inspection. Thus constituted, it could serve as a nucleus, around which, through a phased programme of expansion, an adequate organisation should be built up over the next few years to meet the growing scientific needs of the Armed Forces of the country.

B. Charter of Research and Development Organisation

7. As a supporting establishment of the Armed Services, the Charter of the R&D Organisation is:—

- (a) To render scientific advice to the Service Headquarters.
- (b) To carry out applied research to solve the problems of the Services.
- (c) To design and develop weapons and equipment based on operational requirements defined by the Services.
- (d) To evaluate and carry out technical trials of new weapons and equipment or those developed in the country.
- (e) To render technical guidance to civil trade for the development of new equipment.

The functions of the Research and Development Organisation have been given in the Appendix to Memo. No. F. 23(28)/58/CG (Admin) dated the 19th August, 1959 reproduced in Appendix III.

The Committee note that in accordance with the charter, the Defence Research and Development Organisation is expected to carry out applied research only. However, as has been stated in the earlier Chapter, in actual practice about 5 per cent of the efforts in the Organisation are devoted to basic research in order to sustain applied research, 35 per cent to applied research and 60 per cent to development. The Committee suggest that Government might consider the feasibility of amending the charter of duties so as to make the position clear in the matter of basic research.

C. Structure of R&D Organisation

8. The Defence R&D Organisation follows the same two-tier pattern as that of Service Organisations in general, viz. (a) Headquarters set-up responsible for policy, direction, control and co-ordination as well as liaison with the Services Headquarters, forming part of the overall Defence Headquarters; (b) a large field set-up consisting of Research & Development Establishments and Laboratories and located all over India. Each of these R&D Establishments/Laboratories is responsible for research and development pertaining to an assigned range of defence equipment or an assigned area of scientific research of defence interest.

For the sake of convenience, the R&D Units are further grouped into certain broad functional groups, with corresponding divisions at R&D Headquarters, each under a Technical Director. These broad technical divisions at present are (a) Armaments (including instruments and metallurgy), (b) Electronics; (c) Engineer Equipment; (d) Aeronautics; (e) Vehicles; (f) General Research Laboratories Group concerned with materials research, naval research, food research, physiological and psychological research, as well as research pertaining to other scientific fields of defence interest. In addition, R&D Headquarters has, attached to it, Scientific Advisers to the three Services Headquarters and finally a Directorate of Administration. A layout chart of the Organisation is given in Appendix IV.

The whole organisation is under the Director General of Defence Research and Development, who is the chief executive and is also, concurrently, the Scientific Adviser to the Defence Minister. He is assisted, at the Headquarters, by Chief Controller, who is a Senior Service Officer responsible for the co-ordination of R&D programmes with the Services and a Chief Scientific responsible for overall scientific co-ordination, besides other Directors as indicated above.

Asked whether the combining of the two posts of Director General, R&D and Scientific Adviser to the Minister of Defence has led to better efficiency in the Defence R&D Organisation, the Scientific Adviser has stated that—

“As Scientific Adviser to the Defence Minister, I am called upon to do certain functions like for example, as the Chairman of the Standardisation committee; or in discussions about a certain type of plant for radar development or about selection of weapons by the Defence

Ministry, I go there as Scientific Adviser to the Defence Minister.

I have been the Scientific Adviser as also the Head of the Defence Research and Development Organisation in which a large number of Defence Science Service Officers work. In that capacity I look after the programmes and plans of these 30 and odd laboratories. Particularly we try and assist the defence production in the Department of Defence Production. Combining the two posts in one person provides better co-ordination between the needs of the Ministry of Defence on Scientific matters and the work that is done by the Defence Research laboratories."

The representative of the Ministry of Defence (Department of Defence Production) agreed with the views of the Scientific Adviser.

Chief Controller, Research and Development (CC R&D) and Chief Scientist

9. Chief Controller and Chief Scientist are the two principal staff officers of the Scientific Adviser and the three together constitute the top level executive group or the management group for the Defence R&D Organisation.

It is stated that the division of responsibilities between CC R&D and the Chief Scientist is strictly speaking, not compartmental but of a complementary nature on a functional basis which is briefly as under:

- (i) CC R&D is responsible for the management of equipment-oriented activity in all the units of the organisation and for all matters concerning liaison with the Services. In addition, he deals with such specific subjects in respect of the whole organisation as are assigned to him from time to time. Currently these are (i) foreign exchange (ii) R&D works and (iii) matters pertaining to Service Officers.
- (ii) Chief Scientist is similarly responsible for technique-oriented and applied research activity in all establishments/laboratories of the organisation and for liaison with the scientific staff outside Defence, both in the country and abroad. In addition, as in the case of CC R&D, he deals with the specific subjects in respect of the whole organisation, as are assigned to him from time

to time. Currently these subjects are (i) training of R&D personnel both in the country and abroad and (ii) matters pertaining to DSS.

- (iii) The functions of the both CC R&D and Chief Scientist are thus co-extensive in respect of the whole organisation in their assigned spheres. Merely for purpose of convenience in exercising command and control over R&D establishments on behalf of Scientific Adviser and without prejudice to the functional division of responsibility as at (i) and (ii), the establishments in Armament, Electronics, Engineer, Vehicle and Aeronautics groups as well as the Scientific Evaluation Group are placed under CC R&D and the remaining group of the organisation under the Chief Scientist.

Asked whether there is an overlapping between the functions of the CC R&D and the Chief Scientist, it has been stated that there is no overlap.

Defence R&D Organisation in other countries

10. Notes giving the essential features of Defence Research and Development Organisation in U.K., Canada, Australia and U.S.A. are given in Appendices V to VIII. Information in respect of Japan, U.A.R., USSR and other advanced countries is not available.

Excepting U.S.A. where the Defence R&D set-up is very vast and complex, the R&D Organisations in other leading countries are relatively simple, as in India. The set-up in India has been so modelled as to incorporate the usual features of similar organisations abroad. Generally the same two-tier structure is followed, viz., a controlling and coordinating headquarters composed of a number of Groups/Directorates and a large field set-up of various R&D Establishments/Laboratories. The R&D Organisations in other countries as in India, are manned both by Service Officers and civilian scientists.

D. Defence Research and Development Council

11. The Defence Research and Development Council (D.R. & D.C.) and the Executive Committee of the Defence R&D Council were constituted *vide* Government of India, Ministry of Defence O.M. No. 93877/RD-27/3292/C.G.(Admin) dated the 11th April, 1962: (Appendix IX).

The Council provides direction for the research and development effort at the top Government level. Its composition and functions are as under:—

Composition

Chairman—Defence Minister.

Vice-Chairman—Minister of Defence Production.

Members—Defence Secretary

Secretary, Defence Production

Scientific Adviser

Financial Adviser

Chief of the Army staff*

Chief of the Naval Staff*

Chief of the Air Staff*

Director General, Armed Forces Medical Services

Director General of Scientific and Industrial Research

Director General of Inspection

Chief Controller, Research and Development.

Functions

1. To formulate programmes in regard to research and development, training of personnel and associated matters, and, where necessary, to obtain the approval of the Government.
2. To consider proposals relating to the Defence Research and Development budget for each financial year and submit them for the approval of Government.
3. To implement Government's orders in all matters concerning defence research and development.
4. To review work done in the research and development wings of the Scientific Adviser's Organisation in the Ministry of Defence.

*The Deputy Chief of Staff when Chief of Staff is unable to attend.

5. To liaise with organisations dealing with scientific research and development.

During evidence the Scientific Adviser stated that since the Defence Research and Development Council deals with defence science policy and other scientific matters in collaboration with the three Chief of the Army, Navy and Air Staff and is the top policy making body, it is appropriate and proper that it is headed by the Defence Minister on the analogy of the C.S.I.R. of which the Prime Minister is the Chairman.

Asked whether the Council as at present constituted is competent to guide scientific research, the representative of the Ministry of Defence has stated "I share the view that as at present constituted it does not represent too much scientific talent, because the Ministers are not technical, Chiefs of Staff are not technical, the two Secretaries are not technical officers, the Financial Adviser is not technical. The only technical people we have basically are the Scientific Adviser and the Director General, C.S.I.R. The issue of reconstitution of R&D Council was really taken up about a year ago and the file is now with the Defence Ministry. In consultation with the Scientific Adviser it has been suggested that in addition to the Scientific Adviser and Director General, CSIR, there should be two or three outside scientists of eminence. . . . In the reconstitution we have advised that the Director General of Inspection need not be a full member; but in the Council all officers who are concerned with the items under consideration are in attendance and available."

The Committee are not happy at the existing composition of the Defence Research and Development Council with a preponderance of non-scientist members and feel that as at present constituted it is not perhaps in a position to fully guide and direct scientific research relating to the defence of the country. The Committee suggest that the Council as the policy making body at the highest level should include at least three eminent independent scientists so as to induct more expertise in the Council and make it more broadbased and useful. The committee are glad to learn that the Defence Research and Development Council is in the process of re-organisation and they hope that this will be done without any delay.

E. Executive Committee of Defence R&D Council

12. The functions and powers of the Executive Committee as were delegated to it *vide* Government of India, Ministry of Defence-

Office Memorandum No. 93877/RD-27/611/DR&DC dated the 27th March, 1963—(Appendix—X) are given below:

COMPOSITION

Chairman—Scientific Adviser.

Members—Chief Controller, Research and Development.

Director General of Inspection.

Deputy Chief Scientist.

Director of Technical Development and Production (Air).

A representative of the Defence Ministry

Director of Weapons and Equipment (Army Headquarters).

A representative of Director General Armed Forces Medical Service—when any item relating to medical research is concerned.

A financial officer nominated by Financial Adviser.

FUNCTIONS AND POWERS

Financial

- (a) To sanction new research/development projects upto Rs. 3 lakhs in each case out of the lump sum provision made for this purpose in each financial year. A report of such sanctions will be rendered by the Executive Committee to the Council.
- (b) To deal with proposals for increase in establishment where estimated cost of increase is not more than Rs. 2 lakhs per annum, provided Budget provision exists. Decisions of the Executive Committee will be promulgated in orders of Ministry of Defence and communicated to audit and accounting authorities in the prescribed manner.

Administrative

- (a) To review periodically the progress of research and development work done in the Organisation and report to Defence Research and Development Council.

- (b) To arrange liaison with laboratories and other organisations doing scientific research and development work and periodically review progress.
- (c) To examine half-yearly the progress of expenditure out of the sanctioned budget.
- (d) to examine the forecast budget estimates of each Establishment/Laboratory with particular reference to the following and to submit them for approval of the Defence Research and Development Council:
 - (i) the projects to be taken up during the year;
 - (ii) purchase programme of the year; and
 - (iii) additional manpower/equipments.

The Committee note that out of 9 members of the Executive Committee only three, normally, the Scientific Adviser, Chief Controller, Research and Development and Director General, Inspection are members of the Council. Normally, the Executive Committee should be composed of selected members from the larger body i.e. the Council. Science there are as many as six outsiders in the Committee, the present nomenclature "Executive Committee" would appear to be a misnomer. The Committee accordingly suggest that the nomenclature of the "Executive Committee" should be changed so as to remove any confusion in this regard.

The Committee further note that the membership of the Executive Committee is confined to officers from Army Headquarters and the Ministry of Defence. The Committee suggest that the membership of this Committee should be mainly scientific and should include at least two independent scientists whose presence will be useful to the deliberations of the Executive Committee.

F. Secretariat and Functioning of the Defence R&D Council and the Executive Committee.

Secretariat

13. The Committee have been informed that neither the Council nor the Executive Committee has a separate Secretariat. During evidence, the official witness has stated that previously the Deputy Secretary in the Department of Defence Production who was also functioning as Director of Administration, R. & D. was the Secretary to the Council. The question as to who should provide secretarial assistance to the Council is said to be under consideration i.e. whether it would be provided by the Director of Administration (R. & D)

or by the Ministry of Defence (Department of Defence Production) or the Military Wing of the Cabinet Secretariat which provides it for all the Committees presided over by the Defence Minister.

The Committee consider that for the efficient functioning of the Defence Research and Development Council and Executive Committee, it is essential that they should be provided with suitable secretarial assistance from among the existing staff of the Organisation. They hope that the question of reorganising the present secretarial set-up for the Defence R.&D. Council and the Executive Committee will be settled without any further delay.

Functioning of the Council

14. It has been admitted during evidence that until 1964 the Council had been discussing mostly administrative and procedural matters and that it is only from 1965 that the Council has been discussing policy matters and reviewing the progress of various Groups in rotation. The representative of the Ministry of Defence Production has stated that "I was rather surprised and taken aback that R. & D. Council with that name was only discussing the budget and civil works. I suggested to the Defence Minister in 1965 that this was not the function of the R. D. Council and that it must take interest in various development projects; it must give decisions on policies with regard to development of research projects. *** Now the members of the R. & D. Council have been fairly well acquainted with what is happening in the Council such as how many projects are there and what kind of projects are there how much money has been spent etc. etc. A complete list of all these things is put up to them and it is then discussed."

The Committee are unhappy to note that the Research and Development Council had not been functioning in the manner it was supposed to function and therefore it failed in co-ordinating and directing scientific research relating to the defence of India and the development of or improvement in weapons and material required by the Armed Forces. Instead of dealing with policy matters, determining priorities for Research and Development in defence science, and reviewing the progress of research and development work done by the organisation, it was engaged in the earlier years in discussing minor matters pertaining to administration and procedures. The Committee hope that while the Council is being reorganised, the functions of both the Council and the Executive Committee will be clearly defined and demarcated.

Frequency of meetings

15. In a written note furnished by the Ministry of Defence it has been stated that there is no authorised frequency of meetings of either the Defence R. & D. Council or of the Executive Committee but that the Council has held 13 meetings since its formation in 1962 and the Executive Committee has held 10 meetings.

From the minutes of the first meeting of the Defence R. & D. Council hold on the 30th July, 1962 it appears that it was *inter alia* resolved:

- (a) that the meetings of the Defence Research and Development Council will ordinarily be held at least once a quarter; and
- (b) that Research and Development Executive Committee meetings will be held as and when required and normally once a month.

The Committee have been informed that the Executive Committee was constituted with a view to make the powers of the Research and Development Council operative when it was not actually sitting and it was with that intention that financial and administrative powers were delegated to the Executive Committee.

The Committee are surprised that instead of meeting once every month as originally envisaged, the Executive Committee met only 10 times in the course of the last 5 years i.e. even on fewer occasions than the Council. In this connection the Committee would like to point out that if these two bodies had been provided with an efficient and vigilant Secretariat, the position would have been less discouraging. The Committee desire that while reconstituting the Council and Executive Committee, a clear provision should be made regarding frequency of meetings. They need hardly stress the importance of the Council and the Executive Committee meeting regularly in accordance with the time schedule that may be laid down in this respect.

G. Research and Development Committees and Panels

16. Defence Research and Development Organisation is the executive agency responsible for scientific research and development to meet the needs of the Defence Services. In addition, some machinery is essential to provide necessary direction and orientation for the research and development effort. This machinery at present takes

the form of a number of committees and panels which are composed of the representatives of the User (i.e. the Services), the designer (i.e., the R&D Organisation); the producer (i.e. the Director General, Ordnance Factories and other production agencies in the public and private sectors); and, wherever necessary, eminent representatives of science and industry from outside defence organisations.

Although the functions of the various committees and panels may slightly vary from one another, the three intrinsic functions which almost all of them cover are:

- (a) To advise on build up of resources of men and material for R. & D. work to meet defence needs in the particular field, with which the Committee is concerned.
- (b) To guide and review work of Defence R. & D. Establishments in the particular field.
- (c) To advise on co-ordination of defence and outside scientific effort in the particular field to meet defence needs.

Research Committees

17. There are at present the following Committees:

- (i) Armed Forces Medical Research Committee (A.F.M.R.C.);
and
- (ii) Defence Electronics Research Committee (D.E.R.C.).

Panels

18. There are at present seven Research and Development Panels which are designated as follows:

Name	Short Title
Armament Research and Development Panel	ARDP
Electronics Development Panel	EDP
Engineering Equipment Research and Development Panel	ERDP
Aeronautical Research and Development Panel	AERDP
Naval Research & Development Panel	NRDP
Materials Research and Development Panel	MRDP
Defence Food Research and Development Panel.	FRDP
Vehicles Research and Development Panel	VRDP

Advisory Boards

19. There is one Advisory Board for the Institute of Armament Technology, Poona.

Advisory Committees

20. There are the following four Advisory Committees:

- (i) Defence Metallurgical Research Laboratory Committee.
- (ii) Institute of Nuclear Medicine and Allied Sciences Advisory Committee (I.N.M.A.S. AC).
- (iii) Advisory Committee for the Defence Science Laboratory, Delhi; and
- (iv) Advisory Committee for the Defence Laboratory, Jodhpur.

The Committee have been informed that almost all major establishments and laboratories in the Defence Research and Development Organisation are now covered by a Panel or an Advisory Committee. A Panel covers 2 or 3 establishments because it is for a discipline. But an Advisory Committee deals with one establishment only. It has been stated that the Panels are appointed by Government on the advice of the Scientific Adviser. Each Panel has a Secretary and the Secretariat is provided by the Headquarters Directorate. An intimate relationship is stated to exist between the Panel, the Headquarters and the relevant establishment. The Committee have been informed that action is being taken to form a R. & D. Panel for the Directorate of Psychological Research and Directorate of Fire Research as these have not yet been covered by a Panel or an advisory board.

In para 25 of their 94th Report (Third Lok Sabha), the Committee had suggested that the desirability of having a specialist from the private sector industry on the Defence Metallurgical Research Laboratory Advisory Committee might be considered by the Government. The Committee are glad to note that its earlier recommendation of associating a specialist from the private industry with the Advisory Committee has been accepted. They are further glad to note that provision of associating outsiders has been made in the following cases:—

- (1) Defence Metallurgical Research Laboratory Advisory Committee
- (2) Institute of Nuclear Medicine and Allied Sciences Advisory Committee
- (3) Defence Science Laboratory, Delhi Advisory Committee
- (4) Defence Laboratory, Jodhpur Advisory Committee

The Committee feel that the association of scientists and specialists with the scientific activities of Defence Science Organisation, consistent with the need for keeping secrecy, will be beneficial to the organisation as a whole.

The Committee note that the authorised frequency of the meetings for the Panels. Advisory Committees and Boards is rather vague. The Committee feel that if the various Committees and Panels are to serve the purpose for which they are intended, they should meet more frequently in future, and the number of meetings to be held has to be specified and adhered to.

CHAPTER III
R & D HEADQUARTERS

Composition

21. R & D Headquarters, at present, comprises 15 Directorates/Groups as follows:—

(a) Six Technical Staff Directorates, namely:—

1. Directorate of Armaments.
2. Directorate of Electronics.
3. Directorate of Engineering.
4. Directorate of Vehicles.
5. Directorate of Aeronautics (At present in a nucleus form, as an Aero Cell under an Officer-in-Charge, a Wing Commander and placed under the Director of Engineering).
6. Directorate of Research (Laboratories).

(b) Three Functional Groups, namely:—

1. Directorate of Psychological Research.
2. Scientific Evaluation Group.
3. Scientific Analysis Group.

(c) Four Advisory Groups, namely:—

1. Scientific Adviser to the Chief of Army Staff.
2. Scientific Adviser to the Chief of Naval Staff [at present designated as Director of Scientific Research (Navy)].
3. Scientific Adviser to Chief of Air Staff, and
4. Fire Adviser to the Ministry of Defence.

(d) A Central Technical Coordination Cell.

(e) Directorate of Administration.

An organisational chart of the Defence R & D Organisation is given in Appendix IV.

Technical Staff Directorates.

22. The Technical Staff Directorates at R & D HQ. are stated to be complementary to R & D Establishments and jointly responsible for building-up, planning, organisation and execution of R & D effort in their assigned fields. The role of HQ. staff Directorates comprises the following responsibilities (which are the same for each such Directorate in its respective field):—

- (a) Build-up of competence and capacity for undertaking R & D tasks to meet Service requirements.
- (b) To determine R & D tasks to be undertaken by various R & D Establishments/Laboratories and to formulate detailed policies and programmes for execution of R & D effort.
- (c) Review of work of R & D Establishments/Laboratories.
- (d) Liaison with the Services HQ. and with other agencies at the Headquarters level within and outside defence necessary for implementation of R & D responsibilities of the group.
- (e) To deal with all technical and organisational matters which need planning, coordination, policy direction, supervision and control at the Headquarters level pertaining to their respective R & D Establishments/Laboratories and more generally to their assigned fields of defence research and development and function.

A brief description of the various Directorates is given in the succeeding paragraphs.

Directorate of Armaments.

23. The Directorate of Armaments exercises technical control and supervision over the following Establishments/Laboratories in the Armament Group:—

- (1) Armament Research & Development Establishment, KIRKEE. (ARDE).
- (2) Explosives Research & Development Laboratory, KIRKEE. (ERDL).
- (3) Instruments Research & Development Establishment, DEHRA DUN. (IRDE).

- (4) Defence Metallurgical Research Laboratory, HYDERABAD. (DMRL).
- (5) Proof and Experimental Establishment, BALASORE. (PEE).
- (6) Terminal Ballistics Research Laboratory, CHANDIGARH. (TBRL).
- (7) Defence Research & Development Laboratory, HYDERABAD. (DRDL).

All matters pertaining to Peace Establishments of these Laboratories/Establishments, their requirements of administrative buildings, workshops, laboratories, equipment/machinery, funds and foreign exchange for purchase of equipment and machinery, funds for various projects and expansion schemes, their annual budget allotments, training and recruitment of technical personnel, are progressed by this Directorate.

Directorate of Electronics.

24. The Directorate of Electronics is responsible for providing adequate and effective mechanism for planning, programme establishment, coordination and direction of the effort in the following Electronics Group of Establishments:—

- (a) Electronic & Radar Development Establishment, Bangalore. (LRDE).
- (b) Defence Electronics Research Laboratory, HYDERABAD. (DLRL).
- (c) Solid State Physics Laboratory, DELHI. (SSPL).
- (d) Field Station at Landour.
- (e) Field Station at Jamnagar.

Thus, apart from exercising technical control, the Directorate handles work regarding establishment of facilities, technical equipment procurement plans, manpower planning, training needs of all the three establishments, budgets etc.

Directorate of Engineering

25. The Directorate of Engineering is responsible for the development, inspection and for establishing indigenous production of engineering equipment. It is divided into two main sections, Research & Development and Inspection and Production to conform

to the organisation of the R & D Establishment (Engineers) which it controls. In addition, there is also a coordination section for the purposes of coordinating and integrating the activities of R & D Establishment (Engineers) with that of other Defence and Civil R & D bodies such as, CSIR, Central Road Research Institute and Central Building Research Institute. This Directorate is also responsible for laying down inspection policy, both for manufacture in India and purchases made abroad, exercising over-riding AHSP (Authority holding sealed particulars) powers in granting deviation/relaxation, use of alternative materials in place of prescribed standards, and for giving decisions on technical matters of controversy between the AHSP and heads of other Inspection and Production Establishments, rendering of technical advice on inspection on charge of the Services.

An Aeronautical Cell was formed in the Directorate of Engineering in September, 1963. This cell controls the following two establishments:—

1. Aeronautical Development Establishment, Bangalore (ADE).
2. Gas Turbine Research Establishment, Bangalore (GTRE).

The Directorate is also responsible for compilation of periodical progress reports on development projects, arranging meetings, preparation of agenda and minutes of the Engineer Equipment Research and Development Panel (ERDP), and processing of cases for the release of current equipment spares to R & D Establishment (Engineers).

Terrain Evaluation Cell.

26. A terrain evaluation cell was created in the Directorate of Engineering in February, 1964 to evolve a terrain classification system for the collation and storage of terrain data both for military and civil users.

Directorate of Vehicles

27. The Directorate of Vehicles at R & D Headquarters and a Vehicles Research and Development Establishment at Ahmadnagar were formed recently as a result of bifurcation of the existing set-up under the Director General of Inspection. The Directorate of Vehicles has the same functions as other Technical Staff Directorates at the R & D Headquarters.

Directorate of Research (Laboratories).

28. The Directorate of Research (Laboratories) exercise technical control over the following laboratories:—

1. Defence Research Laboratory (Material), Kanpur.
2. Defence Science Laboratory, Delhi.
3. Defence Laboratory, Jodhpur.
4. Defence Food Research Laboratory, Mysore.
5. Institute of Nuclear Medicine & Allied Sciences, Delhi.
6. Defence Institute of Physiology and Allied Sciences, Madras.
7. Indian Naval Physical Laboratory, Cochin.
8. Naval Chemical & Metallurgical Laboratory, Bombay.
9. Fire Service Research, Development and Training Establishment, Delhi Cantt.
10. Field Research Laboratory, LEH including Agricultural Research Farm and Animal Husbandry Farm.
11. Field Laboratory, Gulmarg.
12. Field Laboratory, Tezpur.

It is responsible for progressing the requirements of administrative/Laboratory buildings, workshops, budget allotments, funds for projects and expansion schemes, training and recruitment of scientific/technical personnel for the different laboratories which function under its technical control. Indigenous production of stores developed is progressed through the National Research Development Corporation and private trade. Financial requirements of new projects to be undertaken in the laboratories and liaison with Services is maintained by discussion and panel meetings. The Directorate progresses and coordinates scientific research efforts in the different laboratories.

Functional and Advisory Groups.

29. The Ministry have stated in a written note that the 3 Functional Groups and 4 Advisory Groups mentioned in para 21 only incidentally form a part of the R & D Headquarters for administrative and historical reasons. The 3 Functional Groups have their

own well-defined charters of duties respectively and they are scientific groups like any other laboratory or establishment. The Advisory Groups form a part of the respective services Headquarters so far as their day to day work is concerned. A brief description of the Functional Groups is as follows:

Directorate of Psychological Research.

30. The Psychological Research Wing was established in 1949 primarily to deal with problems relating to the selection of officers for the Armed Forces. It became a Directorate in 1962 with expanded scope of work and functions. An Applied Psychology Wing was added to the Directorate having two Groups for Human Operator Research and Human Engineering Research.

The detailed functions and duties of the Directorate are as follows:—

- (i) To conduct research in selection methods and maintain required statistics in connection with the selection of personnel for the Armed Forces.
- (ii) To advise respective Service Headquarters on problems relating to Officer Selection, Personnel Classification and Follow-up in Army, Navy and Air Force.
- (iii) To maintain, check and improve the efficiency of the Services Selection Boards.
- (iv) To train personnel in selection procedures both for officers and other ranks.
- (v) To undertake scientific research on the evaluation of training methods and the development of training aids.
- (vi) To advise on human engineering and human operator problems in the three Services.
- (vii) To render help and guidance to other civilian recruiting bodies requiring scientific guidance in personnel selection.
- (viii) To maintain close contact with Services Headquarters, Defence Science Training Units and Service Establishments on Psychological problems referred to the Directorate from time to time.

It has been stated during evidence that this Directorate is not doing any liaison work but is actually engaged in psychological re-

search work. It was only because it happened to be in Delhi that it came to be called the Directorate of Psychological Research.

Scientific Evaluation Group.

31. The Weapons Evaluation Group which was functioning in a nucleus form since 1958 was redesignated as the "Scientific Evaluation Group" in November, 1963. Its charter of duties include:

- (i) To carry out weapons evaluation studies for all new requirements of weapons and equipment to be procured from abroad or produced indigenously.
- (ii) To carry out strategic studies in major national defence problems such as the anti-aircraft and coastal defence systems and to assist in determining the most effective weapons system.
- (iii) To carry out operational research studies with a view to determining the effectiveness of weapons, fire-power of military organisations and such other studies as may be given to it by the Chief of Staff.

Scientific Analysis Group.

32. This Group is on an *ad hoc* basis only for work of a classified nature.

Advisory Groups.

33. The first three groups, namely, the Scientific Advisers to the Chiefs of the Army, Navy and Air Staff are concerned with rendering scientific/technical advice to the respective Service Headquarters to which they are attached. The fourth, namely, the Fire Adviser renders advice to the Ministry of Defence and to all defence establishments, on matters relating to fire fighting, fire prevention and allied subjects.

Scientific Adviser to the Service Chiefs.

34. The charter of duties of the Scientific Advisers briefly is as follows:—

- (a) To assist in the identification and formulation of the scientific and technical problems of the Services including those suitable for operational research studies for demand for scientific and technical investigations and research.

- (b) To render advice to the Chief, Vice/Deputy Chief, Principal Staff Officers, Arms and Service Directors on Scientific matters of interest to the Services; as also the identification, assessment and evaluation of Services problems on scientific lines for investigations, if necessary, by the R & D Organisation.
- (c) To maintain scientific and technical liaison with R & D Organisation and other appropriate bodies.
- (d) To co-ordinate work of the Scientific Advisers attached to Headquarters Commands (at present in the case of Army only).
- (e) To study the contemporary Scientific/technical developments in military science in more advanced countries and to bring such matters as are important, to the notice of the Services.

The posts of Scientific Advisers to the Chief of Army Staff, Chief of Naval Staff and Chief of Air Staff are held by senior officers belonging to the Defence Science Service who are under the technical control of the Deputy Chief Scientist. Problems encountered by the Armed Forces are referred to the Scientific Advisers who in turn consult the Directorate concerned at the Headquarters for suggesting solutions to the problems.

Scientific Advisers attached to Commands.

35. The Scientific Adviser to the Army Staff is assisted by the Scientific Advisers to the Commands who maintain close liaison with the Command staff and advise them on operational problems as and when those are encountered. Where on-the-spot advice is not possible the problems are referred to the R & D Directorate concerned through the Scientific Adviser to Chief of Army Staff.

Problems referred to by the Scientific Advisers are often initiated as development projects or investigations at the R & D laboratories/establishments. The Scientific Advisers sometimes may undertake work on some minor problems.

The strength of Scientific Officers and staff employed at each Command is given below:

	S.A. (Eastern Command)	S.A. (Western Command)	S.A. (Central Command)	Emoluments
	Autho- rised	Autho- rised	Autho- rised	
				Rs.
<i>Gazetted</i>				
Scientific Adviser (PSCO)	1	1	1	1,775
JSO	1	1	..	545
<i>Non-Gazetted</i>				
S.S.A.	1	2	3	470
J.S.A. . . . .	..	1	..	370
Steno	1	1	1	230
Clerk	1	1	..	210
Peon/Messenger	1	..	1	130

It has been stated by the Scientific Adviser during evidence that the above complement is sufficient. Generally it is based on the work-load and is quite enough to tackle the problems. The Deputy Chief Scientist further explained that the staff strength is operated on a pool basis; if more staff is required at a particular place, the staff from other places could be transferred.

The Committee have noted the organisational set-up and working of the Advisory Groups, namely, the Scientific Advisers to the Chiefs of the Army, Navy and Air Staff and the Scientific Advisers attached to Command Headquarters. They feel that with suitable modifications the Scientific Advisers to the Service Chiefs should provide a most useful and strong link between the R&D Organisation and the users (Service Headquarters).

Other Advisory Organisations

(i) *Functional and Advisory Groups*

36. It has been stated that three Functional Groups and the four Advisory Groups only incidentally form a part of the R & D Headquarters for administrative and historical reasons. The three functional groups have their own well-defined charters of duties respectively and the four Advisory Groups from a part of the respective Services HQ so far as their day-to-day work is concerned. During evidence the Scientific Adviser has stated that these are scientific

groups like any other laboratory or establishment and that they are not doing any administrative work.

(ii) *Directorate of Administration.*

The Directorate of Administration deals with all administrative matters relating to the 34 R&D Establishments/Laboratories regarding personnel, stores and equipment, budget and works. The Directorate is headed by a Director of Administration with two Deputy Directors, five Assistant Directors and other Staff Officers under him. There are 14 Sections and 2 Cells in the Directorate. Details are given in the chapter on Administration.

(iii) *Central Technical Coordination Cell.*

The Cell is stated to be doing liaison and coordination work. It has one Service Officer (Lt. Col.) and 8 non-gazetted civilian staff on its authorised strength.*

*At the stage of factual verification, the Ministry of Defence has furnished the following note in regard to the functions and responsibilities of Technical Coordination Cell at R.&D. Headquarters:

"The Technical Coordination Cell at R.&D. Headquarters deals with all those technical and organisational matters both of policy and procedure as well as those involving day to day coordination, which affect more than one HQ Group in the multi-divided Defence R.&D. Organisation. The Cell is responsible for formulation of policy and laying down procedures for initiation, progression and closure of R.&D. projects and other allied scientific/technical effort. It is also responsible for liaison activity, on matters of a general policy nature, with services and inter-services organisations under Ministry of Defence on one hand and with other scientific/technical institutions in the country and abroad on the other. Apart from this, the Cell provides the necessary support to the R.&D. Headquarters for dealing with organised R.&D. activity like the Annual R.&D. Conference, R.&D. Council, R.&D. Executive Committee and for other committees such as inter-Services Equipment Policy Committee, Defence Production Board and so on. This Cell also provides the necessary staff support to the Scientific Adviser, Chief Controller, Research & Development and the Chief Scientist in the discharge of their top management functions of planning, coordination and policy direction for efficient execution of the overall defence R.&D. effort.

This Cell has been in existence in a nucleus form since the formation of the R.&D. Organisation in 1958. The need for strengthening the Cell was felt from time to time and finally in 1966 a separate Permanent Establishment was sanctioned after a review by the Staff Inspection Unit of the Ministry of Finance. It may be added that in order to cope with the tremendously increased workload which this section has had to deal it has been deemed necessary to augment its strength from time to time and presently 2 J.S.O.s have been attached to this Section from the Pool Posts with the approval of Scientific Adviser."

The Committee do not find any justification for retaining the three Functional Groups as part of the Headquarters when they are stated to be scientific groups like any Laboratory or Establishment. The Committee also suggest that the feasibility of separating the three Functional Groups (especially the Directorate of Psychological Research) from R&D Headquarters might be examined.

Role of the Technical Directors.

37. It has been observed by an eminent scientist that the six technical Directors having their offices in Delhi and controlling research and development work carried on in the Establishments/Laboratories scattered all over the country are not doing useful work and that in fact, such an arrangement hampers the progress of work in the Establishments/Laboratories and leads to delay and in efficiency. During evidence the Scientific Adviser conceded that there was some truth in the statement. However, he tried to explain the position in the following terms:

“I want to explain why in defence research and development at the headquarters the position should be different from, for example, in a sister organisation like CSIR.*** Defence Science exists as a primary organisation to service to the three fighting wings, Army, Navy and Air Force. Therefore, a considerable amount of liaison work with the services has to be done. That is why 20 per cent. of my officers are taken from the Army, Navy and Air Force. Constantly, almost every day, the officers in Defence Research and Development have to sit with their corresponding numbers who either evaluate weapons or order them or choose them. This has to be done at headquarters. This is a liaison work which is necessary between the services and the organisations.

Further, unlike CSIR, DR&DO is a Government department. A considerable element of liaison is necessary with many officers *vis-a-vis* Ministry of Defence or the Financial Advisers in the Ministry of Defence. This liaison work on the one hand with the Services who are our customers and users and with the Ministries of Defence and Finance—because we have to get our Projects accepted and passed by them—and then with the CSIR at headquarters, has to be done. The technical directors, to whom you are referring in this question, have a major function of performing this liaison. If they do not do this liaison, the

purpose for which the Defence Science Organisation exists will not fulfilled."

Later on the Chief Controller, R&D also explained their necessity in the following words:

"I feel that there is a great difference in the approach and work of CSIR and our laboratories. Any industry all over India can approach them direct and ask them to solve their problem. In the case of the Services, all the problems that the Service people want to be solved will emanate in the Service Headquarters which is in Delhi, because that unit or the Command will send them through the normal channel to the Service Headquarters, and they are sent to R&D by us. We must be in a position to sit with them, understand their problems, and get them, if possible, to define their qualitative requirements, the quantities they want and in what time they want it to be done. It is only then that the problem can be passed on to the establishment. So, if we do not have such people at the headquarters here, it would be very difficult. The Services also, as customers, expect to be told what the progress is on the problems they have given us, and they expect the people at the headquarters to give the answers, rather than refer it back all the time. They would like to know immediately."

38. The Ministry have further explained the need for Technical Staff Directorates at R&D HQ., in a written note as follows:—

"This question should be appreciated in the context of the overall organisational scheme of the Defence HQ. which includes the three Services HQ., the HQ. of the Inter-Services Organisations together with the associated set-ups of the Ministry of Defence and the Ministry of Finance (Defence). Within this scheme, the tasks for the R&D Organisation emanate basically at the Defence HQ. The initiation, enunciation and formulation of these tasks are matters for detailed examination initially at the HQ. by the competent Technical staff with the staff at Services HQ., before these are converted into concrete projects and then passed on to the appropriate R&D Establishments. All this is done by the Technical Staff Directorate. As an integral part of this function, these Directorates are also concerned with assisting in obtaining the

necessary manpower and material resources *vis-a-vis* the R&D programmes to be carried out in the R&D Establishments/Laboratories in their respective groups and providing all other assistance which these Establishments need from the HQ. The Technical Staff Directorate thus provide full technical staff assistance to the Chief Scientist, Chief Controller, R&D and Scientific Adviser in the planning and execution of R&D effort in their respective fields, besides furnishing information regarding progress of R&D tasks to the general staff, Ministry of Defence and Ministry of Finance (Defence) periodically. In addition, the Technical Staff Directorates in R&D HQ. provide the necessary Secretariat for their respective panels and subsequent progress of all action connected with them. The above pattern of Organisation, which follows the general pattern of Defence Organisation, has been evolved over the years in the light of experience gained in day to day liaison at the HQ. between R&D Organisation and the user service HQ. as well as Ministry of Defence and Finance (Defence).”.

39. It has also been explained to the Committee that there is no overlap of responsibility between the HQ Directors and the Directors of R&D Establishments and there is a reasonably clear cut division of functions. It has been also stated that during the past few years there has been no case of conflict worth mentioning arising from any overlap or blurring of responsibility.

The Committee feel that there is scope for reducing the number and strength of the Technical Directorates which are mainly concerned with liaison and coordination. They are inclined to think that the number of scientists at the Headquarters should not be large. In so far as the Defence R&D Organisation is concerned, the real work is done at the Establishments/Laboratories and the scientists should be usefully employed there. The Committee would urge that at the time of implementing the decision to introduce the Model Constitution in the Defence Research Establishments/Laboratories in terms of the Cabinet Secretariat letter of 16th April, 1964 (Appendix XI), Government will take the opportunity of reorganising the Headquarters set-up with a view to reducing the Directorates to the barest minimum compatible with efficiency,

The Committee have been informed that the Technical Directors at the Headquarters and the Directors Incharge of Establishments/Laboratories belong to the same cadre and grade and yet while the Technical Director can sanction a project upto Rs. 50,000 , the Director can sanction upto Rs. 20,000 only. This in the opinion of the Committee would appear to be an anomalous position and needs to be looked into. The Committee also suggest that the Director at the Headquarters and the Directors Incharge of Establishments/Laboratories should be inter-changed after a certain period of time as such a system will add to the experience and efficiency of officers.

CHAPTER IV

LABORATORIES AND ESTABLISHMENTS

A. Organisation

40. As already stated there is a large field set up consisting of over 30 Research & Development Establishments and Laboratories. Each of these R & D Establishments/Laboratories is responsible for research and development pertaining to an assigned range of defence equipment or an assigned area of scientific research of defence interest. A list of R & D Establishments/Laboratories is given in Appendix XII.

It has been stated by the Scientific Adviser during evidence that already there are 30 defence R & D Establishments/Laboratories in the country and it is not proposed to add to them during the current year. He has also stated that one or two establishments may, however, come up during the next four or five years. A proposal for a Naval Establishment is under consideration but it has not been possible to go ahead with it on account of pressing need for economy. The representative of the Ministry of Defence agreed that the existing establishments needed to be fully exploited and all efforts should be directed towards consolidation.

In a written note the Ministry of Defence has stated that it would be rather difficult at this stage to pick individual R & D Establishments/Laboratories that would need strengthening and augmentation during the 4th Five Year Plan period. A more realistic approach perhaps would be to indicate some of the areas in which, according to them, wide gap exists and to fill up which would call for a consolidated action all round on a priority basis. The areas which need immediate attention are Armament, Electronics, Engineering and re-inforced plastics among the material group. It is anticipated that the plans for expansion in these areas which were envisaged some time ago would materialise in the very near future. Forward planning in terms of build up of facilities and resources in the fields of Missiles, Aeronautics and Naval research has also been taken in hand as a long range objective depending upon the availability of funds. For this, while some of the R & D Establishments would need considerable strengthening on a priority basis, as directly concerned in these fields, many others like R & D Establishments for Metallurgy, Materials Instruments and Proof would require similar strengthening as supporting establishments.

The Committee feel that during the Fourth Plan period greater attention should be paid to strengthen, augment and accelerate defence research and development efforts in areas where a wide gap exists and which require to be filled up to meet the country's urgent defence needs. They, however, would like to stress that the number of establishments/laboratories set up and the magnitude of expenditure should be related to the availability of experienced scientists of whom there are not many and to the capability of these institutes to absorb gainfully the funds placed at their disposal.

B. Management of Defence Research and Development Establishments and the Model Constitution

41. In their 94th Report (Third Lok Sabha) on the Ministry of Defence—Defence Research and Development Organisation—D.M.R.L.—the Estimates Committee had observed that the appointment of a Governing Council as envisaged in the Model Constitution (Appendix XI) as approved by the Cabinet for adoption by institutions and laboratories concerned with scientific research, would be a step in the right direction. The Scientific Adviser when he appeared before the Committee in January, 1966 had stated that the comments of the R & D Organisation on the proposed Model Constitution had been forwarded to the Ministry of Defence and the Committee had expressed the hope that an early decision would be taken in the matter.

The Committee have been informed that the matter is still under the consideration of the Government. The difficulties in the adoption of the Model Constitution and setting up a Governing Council for each Establishment/Lab. have been explained by the representatives of the Ministry of Defence during the evidence as follows:—

“Under the model constitution, the Governing Council should be the highest authority for that institution. Now, what we feel is this that it will be not so easy to set up 30 governing councils and give them full powers to control the institutions including budget, appointments, projects and every thing. Then you come up against the problem which you have yourself raised of coordination. We have had a discussion and it is our preliminary view that the laboratories doing similar work or dealing with similar subjects should be lumped together and should be under one governing council so that for all the 30 and odd establishments we might have 5 or 6 governing councils. Even when you have set up the governing councils it will be necessary in our view to at least fix some limit of the

budget. It will be impossible in our system of parliamentary responsibility to give power to the governing council to fix its budget also, because, the budget has to be finalised and voted upon by Parliament. So, some central body will have to fix at least the top limit of the budget. They should also have some kind of authority to ensure that necessary directions can be issued. Generally, directions can be issued to the governing council. Subject to this, as far as we in the Department of Defence Production are concerned, we are prepared to recommend that the Governing council should have full powers over those establishments."

The Model Constitution provides that the Head of a research laboratory/institution should be a scientist of appropriate calibre; particularly in the case of an institution mainly devoted to research, the Head should be a scientist who has distinguished himself in research. When asked about the suitability of Service Officers heading R&D Establishments and Laboratories, the Scientific Adviser has stated as follows:—

"I just want to add one or two sentences because this is a matter of great importance. We deal with defence research. Civil laboratories like the CSIR deal with industrial research. Just as when we want to get an experienced industrialist into industrial research we do not ask what are your academic qualifications, we only ask what is your experience in utilising research for industry. Here also if we want to get a service officer in our research organisation permanently we do not attach much importance on his academic qualifications but we ask what is your experience. That is how these officers who have come with their experience and who have been given special training are heads of establishments and in our recent times we have been looking into it much more carefully. I can assure you that the present selection lays great importance on their service experience and on their technical qualifications and not so much on their academic qualifications because these are not pure research organisations."

The representative of the Ministry of Defence also justified the selection of service personnel to be heads of research establishments on the following grounds:

"We took up this question some 18 months ago. The orders now are that an officer can come on tenure and an officer

is permanently retained only when he comes for a second tenure and has reached the rank of Lt. Colonel. This gives us as well as the officer an opportunity to see whether he is suitable for research and development work and we are also quite choosy now because we have got a fairly adequate cadre and there are fair chances of promotion if a man is good and we do not have to carry him for a long time because we take him after he has done 15, 16 or 17 years' service. So we know his capacity sufficiently well. Whatever might have been said of intake in the past it is not likely to occur that people who are unsuitable for research and development work will be taken. About those also who came earlier, I cannot say that they are necessarily the rejects of the Army. Some of them may be but then I said a good scientist does not make a good regimental officer and *vice versa*."

The Committee are unhappy to note the delay in the adoption of the Model Constitution for R&D establishments and laboratories. They would, however, like that the Governing Councils for the Laboratories are carefully constituted so that they are able to give proper guidance. The Committee hope that introduction of the Model Constitution in the Establishments/Laboratories of the Defence Research and Development Organisation will enable them to carry on the work of research and development efficiently and without any administrative delays.

C. Size of a R. & D. Establishment

42. During evidence the Scientific Adviser has stated that it is difficult to say what the optimum size of a defence research laboratory should be. It depends on the country, the efficiency and ability of the scientists to handle large sizes, the historical circumstances and so on. He favoured comparatively small establishments in India of about 30 to 40 officers and corresponding number of other people and stated that he would like to limit the new establishments to that size.

The Zuckerman Committee have referred to the size of the defence research establishments in the U.K. as follows:—

"Broadly speaking, establishments are usually large in defence, where they are concerned mainly with applied research (with future development very much in mind), or with development work itself. A few very small defence research units also exists, either associated with the larger

establishments or geographically isolated for specific purposes such as weapon testing.”

The Committee realise that it may be difficult for every laboratory or establishment to reach the optimum size. Efforts should, however, be directed to limit the expansion because beyond a certain size the principle of diminishing returns acts strongly against the added investment.

D. Criterion for setting up of Laboratories/Establishments

43. The Committee have been informed that before a decision is taken to set up a laboratory in the D.R. & D.O. the matter is thoroughly examined with a view to ensure that facilities in the particular field do not already exist under the CSIR, Atomic Energy Commission and other related Scientific Organisations and that every care is taken to avoid repetition of efforts. In this connection the Committee have examined a few laboratories as mentioned in the paragraphs that follow.

Solid State Physics Laboratory, Delhi (S.S.P.L.)

44. The Committee desired to know the necessity for setting up the Solid State Physics Laboratory at Delhi when already there was a Solid State Physics Division in the National Physical Laboratory of the Council of Scientific and Industrial Research and a Physics Department in the Delhi University and whether instead of setting up a new laboratory the existing institutions could not have been strengthened to meet the defence requirements. The Scientific Adviser has stated that in both the N.P.L. and the Delhi University, the Solid State Physics programmes are on a very modest scale. Even if they expand it, the defence needs will not be met at all. It is said to be a very vast and modern subject which has permeated into electronics so much that without solid state physics in defence, they would not be able to modernise equipments.

As regards the projects completed by the Solid State Physics Laboratory, in a written note the Ministry have stated that:—

“The Solid State Physics Laboratory (SSPL), Delhi, was formed only towards the end of 1962. In its initial period of first two years or so, the laboratory has mostly concentrated in the recruitment of suitable scientific and technical staff, their training and procurement and establishing facilities for the conduct of scientific work. In the short intervening period, therefore, it will be appreciated that it would be rather unfeasible for any of the

projects to have reached production stage. However, development work on a few projects has been completed, viz. a process for purifying commercial grade silicon to semi-conductor grade purity, process for fabrication of solar cells and development of thermo-electric generator.

Production of semi-conductor grade purity silicon on a pilot plant scale at SSPL has now been approved by the Electronics Committee constituted by the Cabinet Committee on Department of Defence Supply. The solar cells have been fabricated for initial field trials. The production of solar cells on pilot plant scale at the laboratory will be considered after user trials and assessment of Services' requirement."

The Scientific Adviser has explained that the mode of collaboration between the various institutions conducting solid state physics research work is through mutual discussions held amongst the Directors of S.S.P.L., C.E.R.I., Pilani and National Physical Laboratory, Delhi.

The Scientific Adviser has added that the Directors of the three Institutes occasionally meet together and farm out their research projects according to their own equipments and training personnel.

While the Committee accept that the Solid State Physics Division of the National Physical Laboratory and the Solid State Physics Department of the Delhi University are only a small affair as compared to the Solid State Physics Laboratory, they are not much impressed with the achievement of the Solid State Physics Laboratory. They regret that none of the projects have so far reached a production stage. They would like that there is closer coordination and cooperation between this Laboratory, Central Electronics Engineering Research Institute, Pilani, Solid State Physics Division of the National Physical Laboratory and Solid State Physics Department of the Delhi University at institutional levels. In this connection the Committee would like to draw attention to the observations made in their 103rd Report (Third Lok Sabha) relating to the National Physical Laboratory, C.S.I.R.:—

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

Defence Food Research Laboratory (DFRL)

45. The Committee desired to know why it was found necessary to set up the Defence Food Research Laboratory at Mysore when the Central Food Technological Research Laboratory of the C.S.I.R. was already there. It has been stated that the Food Research Group of Defence Science Organisation was formed as early as 1949 as a division of the Defence Science Organisation, Delhi to deal with all food problems peculiar to the Services such as those dealing with processing, preservation, storage and packaging of foodstuffs; evaluation of nutritional requirements of the forces under widely different environmental conditions; development of operational ration packs etc. Because of increasing commitments in the field of defence food research and the necessity for developing widely different and newer types of food items to meet the operational requirements of the services, a proposal to set up a Defence Food Research Laboratory at Mysore under the Defence R & D Organisation at an estimated expenditure of Rs. 7.75 lakhs (capital) and Rs. 3.96 lakhs (recurring), was submitted to the DM's Scientific Research and Development Committee at its 1st (60) meeting held on 11th Feb. 1960. The proposal was stated to have been formulated after consultation with Director General, CSIR and Director, Central Food Technological Research Institute, Mysore.

The proposal was modified by Government restricting the scope of work to be undertaken at the Defence Food Laboratory to *meeting the urgent operational requirements of the Services*. The financial effect was reduced to Rs. 3.19 lakhs (capital) and Rs. 1.02 lakhs (recurring). It was urged in the revised paper that the food requirements of the troops under abnormal conditions require special research which could not be covered under the purview of the National Food Laboratory. The troops would have to be experimented upon in field trials, for all types of new rations, both for their nutritive value, and psychological acceptance. The development of emergency rations and composite packs for patrols on reconnaissance or special missions would be equally significant in this context. It has been stated that the development of such military foodstuffs would obviously require the close cooperation, assistance and advice of the services, defence Scientists and Army Medical Corps who are directly concerned with the dietetics and nutrition of foodstuffs supplied to the troops.

As Government still had some doubt regarding the scheme to set up a separate Defence Food Research Laboratory, at Mysore, it was suggested that as an alternative, the food research facilities at

Defence Science Laboratory, Delhi should be augmented at an estimated expenditure of Rs. 1.75 lakhs (capital) and Rs. 1.03 lakhs (recurring). After further discussions the proposal to set up a Defence Food Research Laboratory at Mysore was agreed to by Government *on the specific understanding that the laboratory would undertake exclusively problems of defence interest.* It was also agreed that as many of the problems of food research, particularly basic problems, as could be dealt with adequately by the Central Food Technological Research Institute would be passed on to the latter.

It has been stated that defence food research would be intimately tied up with development in the laboratory, field trials in operational areas and cooperation of the medical personnel of the Armed Forces, and that the defence research is an inter-service affair and cannot, in the very nature of things, be entrusted to a non-defence institution like Central Food Technological Research Institute, Mysore.

The Committee have been informed that prior to the formation of the Defence Food Research Laboratory at Mysore towards the end of 1961, the QMG Branch had approached the Central Food Technological Research Institute on development of emergency rations etc. and Central Food Technological Research Institute had pleaded inability to undertake work on account of their pre-occupations. As there was an urgent need for doing defence projects a decision was taken to set up the Defence Food Research Laboratory. Copies of correspondence between the QMG Branch and Central Food Technological Research Institute on the subject of emergency rations, are given in Appendix XIII.

The Committee have been informed that the Director, Central Food Technological Research Institute is a member of the Defence Food R&D Panel. In addition, a Joint Defence Coordination Committee of Defence Food Research Laboratory and Central Food Technological Research Institute also exists to review defence food projects. The Joint Defence Coordination Committee was set up in 1964.

The Committee have viewed with great concern the circumstances in which the Defence Food Research Laboratory was set up. They are surprised that a laboratory of the CSIR which is maintained by the Government of India should have expressed its inability to undertake the defence work on the plea of being pre-occupied. This only shows lack of coordination between the Defence R. & D. Organisation and the C.S.I.R. The Committee hope that research laboratories under the C.S.I.R. will not in future

refuse to undertake research work whenever approached by the defence authorities.

The Committee would also urge that closer coordination is maintained between Defence Food Research Laboratory and Central Food Technological Research Institute and only those problems which are exclusively of defence interest and for which facilities do not exist in the Central Food Technological Research Institute should be undertaken by the Defence Food Research Laboratory. It should be the endeavour of the Government to utilise the research facilities available in the Central Food Technological Research Institute to the maximum possible extent.

Aeronautical Development Establishment, Bangalore (ADE)

46. There are four institutions at Bangalore dealing with aeronautical research, viz. Aeronautical Development Establishment and Gas Turbine Research Establishment (under Defence Research and Development Organisation), Hindustan Aeronautics Ltd., (under the Ministry of Defence) and the National Aeronautics Laboratory (under CSIR). The Committee desired to know whether it would not be desirable to have one organisation for aeronautical research which could meet both civil and defence requirements. The Scientific Adviser has stated that these institutions have different complexion, their areas of research are quite distinct and there is no overlapping and hence it will be undesirable to merge them into one organisation. The best that can be said as necessary and desirable is that there should be coordination between the work of these four institutions. The Secretary, Defence Production has, however, pointed out that Aeronautical Development Establishment's charter of duties is so wide that it could do everything and that certainly requires a closer look.

An eminent scientist has also represented to the Committee that the progress of the Aeronautical Development Establishment has been very unsatisfactory and cannot justify its existence and that it should be wound up. The Ministry in a written note have also stated that the Aeronautical Development Establishment has not so far been able to do much in regard to development of indigenous substitutes. The Scientific Adviser had himself in one of the Annual R. & D. Conferences observed that it is a high time that Aeronautical Development Establishment devised some means of checking its own programmes and its work with the help of their appropriate Panel.

The Committee feel that there is much scope for coordination of research activities especially from the point of view of equipment among the various aeronautical institutions located at Bangalore. The Committee suggest that the Executive Committee of the Research and Development Council should go into the matter.

The Committee feel that sufficient thought was not given when the Aeronautical Development Establishment was formed and they are unhappy about the achievements of the Establishment. They hope that the Executive Committee would take into consideration the feasibility of merging the Aeronautical Development Establishment with any other organisation doing allied nature of work.

E. Location of Research Laboratories/Establishments

47. The Third Reviewing Committee of the CSIR in their Report have stated that the following considerations should play an important part in determining the location of research institutes:

- (1) The commodity or industry-oriented laboratories should be located close to the principal centres of users.
- (2) Regional laboratories and discipline-oriented laboratories should be located near a university.
- (3) Location of new laboratories in crowded cities where the population density has already created civic and social problems should be avoided. In such a case, it may be an advantage to locate them in a nearby suburb or medium size town. Similarly, location in out of the way places having no civic or social amenities or workshop, engineering and academic facilities should be avoided.
- (4) Where more than one research station or institute belong to the CSIR is located in the same town or when the Central laboratories are setting up their field stations, it would be of advantage to locate them in the same campus.

The Scientific Adviser has stated that these considerations apply to any research laboratory.

During evidence the Scientific Adviser has stated that by and large the Defence Research and Development Laboratories/Establishments have been located to get the maximum locational advantages. He has however admitted that in every case the choice has not proved to be the best choice over the years and has cited the case of the Institute of Work Study and the Himalayan Radio Propagation Unit which are located in Landour, about which there have been complaints.

Institute of Work Study, Mussoorie

48. It has been stated that the main consideration for locating it at Landour (Mussoorie) was that enough accommodation was available for starting the Institute immediately. But subsequent experience has shown that this is not the correct ideal location for the Institute because of the following reasons:—

- (i) Landour has inclement weather from November to March, making it inconvenient to hold work study courses.
- (ii) There are no industries at or near Landour which students can visit as part of their work study course.
- (iii) Students have to spend more than what they are entitled to get as DA in view of the higher cost of living at Landour.
- (iv) Difficulties have been experienced at Landour in arranging Lectures by outside experts.
- (v) Although there are regimental centres and military units in nearby Dehra Dun, there are no military installations or base workshops near Landour where defence problems in work study could be processed, as part of the work study courses at the I.W.S.

The Ministry have in a written note furnished the following background information.

relating to selection of Landour (Mussoorie) for establishing the Institute:—

"A paper on 'the introduction of the work study in the Services' was submitted by R. & D. Organisation to DM's R. & D. Committee at its meeting held on 24th February, 1961 and it was decided to accept the recommendations in the paper regarding work study courses for the Services. A symposium on work study, followed by an introductory course, was organised by the Defence R. & D. Organisation in May/June 1961 and as a result of the experience gained thereby, a statement of case for establishing an Institute of Work Study, with financial implications, was prepared by R. & D. Organisation and submitted to DM's R. & D. Committee at its meeting held on 23rd August, 1961. Briefly the proposal was to set up an Institute of Work Study under the R. & D. Organisation at Landour (Mussoorie) whose accommodation was readily available for the proposed Institute. The Institute was primarily intended for appreciation courses and basic courses on work study for the personnel of the Defence Services at all levels. Other allied subjects for which short courses would be organised were office organisation and methods, human and industrial relations, motion and method study, time study, operational research, incentives etc. The DM's R. & D. Committee at this meeting (23rd August, 1961) decided to accept in principle the setting up of an Institute of Work Study. It was suggested at this meeting that Landour might be an out of the way location for an institution of this kind. The Defence Minister agreed and the Committee directed that enquiries for site location of the IWS should be pursued further and Ootacamund might also be considered in this context.

Meanwhile, towards the latter half of 1961, the former CCR&D (Maj. Gen. B. D. Kapur) visited the ICI Directorate of Work Study in U.K. and on his return to India, recommended in October, 1961 that the Defence Institute of Work Study might be set up at Landour, as in his opinion the location would not matter, provided suitable accommodation could be found for the Institute. It was also stated that the DM had approved the location of the I.W.S. at Landour subsequent to the D.M.C. meeting on the subject. The Ministry of Finance (Defence) again suggested a review of the site location. In Nov. 1961 the

former CCR&D urged that no place more suitable than Landour could be found for the Institute. As regards Landour being out of the way, it was pointed out that the National Administrative College was also located in Landour/Mussoorie area. The Ministry of Finance (Defence) accepted the position in December, 1961 because the Ministry of Defence has come to the conclusion that no other more suitable location could be found and Government sanction to set up the IWS at Landour under the Defence R. & D. Organisation was accorded in December, 1961."

The Ministry have informed the Committee that at a very rough estimate the cost of construction of new building for Institute of Work Study at another site would be about Rs. 23 lakhs, excluding the cost of land as it has been anticipated that defence land would be available for Institute of Work Study.

The Scientific Adviser has stated during evidence that the question of shifting the Institute of Work Study has been considered but economic considerations have made the solution difficult. It has also been anticipated that it will take another 5 years before the Institute of Work Study is shifted to a new location.

The Committee are distressed to note the casual manner in which the decision to locate the Institute of Work Study at Mussoorie was taken by Government. Lack of proper consideration and planning in the selection of the location of the Institute has resulted in waste of effort and money and dislocation of work. They need hardly point out the necessity for a thorough and careful examination of such matters before reaching a decision. The Committee would urge that in future very careful thought should be given to all aspects before deciding upon the location of a Defence Research Institute or Laboratory. In so far as the Institute is concerned, the Committee suggest that it should be shifted to a suitable new location which is easily accessible both to private industries and Defence installations, as soon as possible.

Defence Research Laboratory (Materials), Kanpur

49. The Committee understand that the Chemistry Section of the Defence Research Laboratory (Materials) was shifted to Gwalior in 1964 and that for many months the staff were sitting practically idle there because of lack of electricity. The Ministry have, however, in a written note stated that "there had been some break-down of electricity, as happens in every expanding city. However, it has not caused break-down in the work."

During evidence it has been stated that excepting the Biology Section of this Laboratory all the other sections are proposed to be shifted to the new unit at Gwalior during the next 5 years or so when the necessary buildings would be available.

When asked whether the inducement of free land, is a sufficient reason to shift a laboratory from one place to another and more so from Kanpur which is an industrial town the Scientific Adviser has stated in reply that the question of free land is not the only factor; Kanpur has outgrown itself and there is no place to expand certain sections. So additional place had to be found. Gwalior came in handy because space was offered there. He has however added that just the availability of space or offer of free space will not result in shifting of the whole institute.

The Committee are not fully convinced with the reasons advanced for shifting major portion of the Defence Research Laboratory (Materials), Kanpur to Gwalior. They realise that there is congestion at Kanpur and sufficient space is not available to meet the needed expansion and development of the Laboratory. Yet the Committee are inclined to feel that Kanpur has a clear locational advantage over Gwalior, being a centre of industrial units and technical institutions and having connected research facilities. They would like to impress upon the Government the desirability of carefully considering all the pros and cons before any Laboratory is shifted from one place to another. In this connection the Committee would like to invite the attention of the Government to a similar observation they have made in para 16 of their 94th Report (Third Lok Sabha) regarding the shifting of the Defence Metallurgical Research Laboratory from Ishapore to Hyderabad in 1963-64.

Terminal Ballistics Research Laboratory, Chandigarh (TBRL)

50. The Committee have been informed that the Terminal Ballistics Research Laboratory, as the name signifies is engaged in the investigation of terminal effects of various types of shells and other ammunition on the targets, while ERDL (Explosives and Research Development Laboratory) deals with Research and Development work in the field of explosives, propellants for small arms and guns, rocket propellants, initiators, pyrotechnic and smoke composition and large variety of material used in the manufacture of ammunition such as Plastics, textiles, paper and board, paints and varnishes, adhesives etc. The role of the two laboratories being distinctly different the equipment and the facilities at the laboratories are also different.

During evidence the Committee enquired whether the Terminal Ballistics Research Laboratory at Chandigarh is not out of tune with the environments in which it is situated. The Chief Controller, R & D explained that efforts were made to locate an area in the vicinity of Kirkee where two Armament Establishments exist. In fact different sites were examined. It has been stated by the Ministry that a site in Rajasthan was also considered along with the sites in Punjab, U.P. and Delhi. The Board of Officers constituted for the purpose of selection of the site for TBRL, recommended in the following order of priorities:—

- | | |
|-----|------------|
| 1st | Chandigarh |
| 2nd | Ajmer |

The site at Ajmer in Rajasthan was not selected due to the following reasons:—

- (a) Ajmer is connected by a metre gauge whereas Chandigarh is connected by a broad gauge. This was considered a handicap for transport of equipment and ammunition to and from the laboratory if it was situated at Ajmer.
- (b) No residential accommodation was available at Ajmer which could be provided to the personnel of the Laboratory.
- (c) There were no technical or trade facilities available in Ajmer which could be used by the Laboratory.

In the course of their study visit to the Terminal Ballistics Research Laboratory in Chandigarh during June, 1967, the Study Group were informed that the Laboratory required an extensive range area of 6-12 sq. miles on flat land. The only place suitable within a 50 mile radius of Poona/Kirkee could not be considered as it was earmarked by the State Government for an industrial estate. In view of this, efforts for locating this facility at Kirkee were abandoned. It was also not considered advisable to locate this Laboratory in this area on account of already existing heavy concentration of other R & D and Production establishments. The site near Chandigarh was selected as the most suitable one on account of the following considerations:

- (i) The only suitable piece of land of the required area was found near Chandigarh.
- (ii) The area possessed all the important characteristics *e.g.* extensive flat terrain having hilly terrain on one side and is ideally suited to the location of such facilities.

- (iii) The considerable interest and help promised and given by the Punjab Government to set up the range.

The Study Group were further informed that facilities like Reference libraries of Punjab University and Central Scientific Instrument Organisation; good precision workshops and foundries in industrial area at Chandigarh; requisite power supply, water supply and ease of communication; availability of free land for the construction of main laboratory; waiving the capitalised cost of land by the Punjab Government; construction of 3 miles link road and construction of all-weather bridge and laying out power line from Chandigarh by the Punjab Government were the technical and other trade facilities available to the laboratory at Chandigarh.

The Committee do not feel satisfied with the reasons advanced for setting up and locating the Terminal Ballistics Research Laboratory at Chandigarh. On the other hand they are inclined to feel that Explosives Research and Development Laboratory at Kirkee could have been suitably expanded to meet the needed requirements which necessitated the setting up of the Terminal Ballistics Research Laboratory at Chandigarh.

The Committee would like to stress that as far as possible, the Research Institutes should be located in close proximity to areas where industrial, technical and operational facilities are available.

In view of the fact that there have been several cases of initial location and subsequent shifting from the place of location of Research laboratories which resulted in wastage of money, manpower and time, the Committee desire that enquiry should be made so as to ensure that such cases do not recur.

CHAPTER V

ADMINISTRATION

A. Directorate of Administration

51. Within a few months of the appointment of the Scientific Adviser to the Minister of Defence in July, 1948, the scope and functions of the Defence Science Organisation began to crystallize and a Registrar was appointed in March, 1949 to assist the Scientific Adviser in the administration of the Organisation. At the outset, 40 Senior Scientific Officers and 100 Junior. Scientific Officers were authorised for the Organisation and the administration was largely concerned with the planning of laboratories/institutes, recruitment of scientific and technical staff and procurement of labouratory equipment.

With the setting up of the Defence Science Laboratory in 1950, followed by the establishment of Naval Chemical and Metallurgical Laboratory, Bombay, Indian Naval Physical Laboratory, Cochin, and the Institute of Armament Studies (now designated as Institute of Armament Technology) at Kirkee, the Scientific Adviser to the Minister of Defence was vested with powers to purchase scientific equipment and to recruit non-gazetted scientific/technical staff directly. The gazetted staff was, however, recruited through the Union Public Service Commission.

In the year 1953, the Defence Science Service was constituted to provide a close integration of the scientific work in the different defence establishments and a more effective means of utilising available scientific talent for defence R. & D. effort.

Consequent on the setting up of a separate Department for Defence Research and Development with effect from January 1, 1958, by merging the earstwhile Defence Science Organisation and the Technical Development Establishments which were concerned with research and development, a unified directorate of Administration was created by amalgamating the administrative staff of the Directorate of Technical Development and the Registrar, Defence Science Organisation.

While the day to day administrative work of 30 Laboratories/Establishments is done by the Administration Divisions (consisting of

Administrative Officers and subordinate staff) attached to each Laboratory/Establishment, the policy and administrative problems regarding personnel, stores and equipment, budget and works, are dealt with by the Directorate of Administration at the Headquarters, headed by a Director with two Deputy Directors, four Assistant Directors and eight Staff Officers under him. The Director of Administration is responsible to the Scientific Adviser through the Chief Controller of Research and Development and the Chief Scientist.

The Organisation Chart of the Directorate of Administration is given in Appendix XIV.

B. Staffing Pattern of Defence R. & D.

52. The staff strength of the entire Defence R & D Organisation as on April 1, 1966 was as follows:—

	Authorised.	Actual	Vacancies
A. Civilian			
(i) Gazetted Officers	1161	922	239
(ii) Non-Gazetted Officers	10337	8673	1664
TOTAL	11498	9595	1903
B. Service Personnel			
(i) Officers	215	182	33
(ii) Other Ranks	343	332	11
TOTAL	558	514	44
GRAND TOTAL	12056	10109	1947

As against the figures of civilian Gazetted Officers shown in part A above, the administrative and other officers (non-scientific) as on 1-4-1966 was as follows:

	Authorised	Actual	Vacancies
(i) Administrative Officers	52	46	6
(ii) Other Officers (non-scientific)	40	29	11
TOTAL	92	75	17

The staff strength of the R&D Headquarters as on 1-6-1966 was as follows:

	Autho- rised	Actual
<i>Civilian Staff</i>		
(i) Gazetted Officers	129	101
(ii) Non-Gazetted staff	570	476
TOTAL	699	577
<i>Service Personnel</i>		
(i) Officers	45	44
(ii) Other Ranks	17	16
TOTAL	62	60
Total Strength	761	637

It has been stated during evidence that against the total authorised strength of 129 Gazetted Officers, there are 18 Administrative Officers at the Headquarters of whom one is a Engineer who looks after the Works Projects of the Establishments. It has further been stated that this strength is comparable to the strength of similar organisations on the civil side. The representative of the Ministry of Defence has also stated during the course of evidence that the Directors under the Council of Scientific and Industrial Research have much wider powers than the Directors in the R&D Establishments. There are as many as 305 Administrative Officers and staff in the Headquarters of the Council of Scientific and Industrial Research.

The Scientific Adviser has stated during evidence that "the administrative staff is sanctioned on the basis of a periodical review of the establishments. *Prima facie* it is not excessive." He has added that the question of administrative staff at the Headquarters is now a matter of scrutiny and discussion between the Directors of Administration and Staff Inspection Unit of the Ministry of Finance.

In a written note submitted later to the Committee it has been stated:

"SIU recently carried out a staff inspection of the Headquarters of the R. & D. Organisation and covered all posts other than the posts of Scientific Adviser, Chief Controller, R. & D. and Deputy Chief Scientist and their personal

staff. The existing strength and SIU's recommendations were as under:

	As authorised		As recommended by SIU	
	Tech. and Scientific	Others	Tech. and Scientific	Others
(i) Gazetted . . .	164	18	102	8
(ii) Non-Gazetted. . .	147	333	136	296

The recommendations of SIU concerning non-gazetted staff have already been accepted and implemented.

The strength of gazetted administrative posts in the Directorate of Administration has since been finalised at 13 officers and Government orders issued accordingly.

As regards the gazetted posts, while the SIU has carried out the staff inspection in accordance with the charter, Scientific Adviser has observed that in his view SIU cannot examine the workload of Scientific and Technical Officers. The Department of Defence Production are processing the matter further with the Committee on Administration. The SIU of the Ministry of Finance however consider that SIU is concerned with the assessment of the workload and the requirement of the staff to handle the load rather than with the organisational set up.

The ratio of gazetted to non-gazetted staff engaged on administrative work is 1: 7.6 in C.S.I.R. and 7:8.4 in R. & D. Organisation."

The Committee note that 'liaison and co-ordination' is the main function of the R. & D. Headquarters. That being the case, they feel that the Headquarters Directorates are overstaffed more particularly in regard to officers. In their opinion a small compact Headquarters would better serve the interests of research work assigned to the R. & D. Organisation. They are, however, glad to note that the staff strength at the R. & D. Headquarters has been reviewed by the Staff Inspection Unit and, as a result of the recommendations made by the Unit, some reduction has been made both in the Gazetted (Administrative) and in the non-gazetted Establishment.

The Committee have been informed that the Government have agreed to adopt the Model Constitution as envisaged in the Government of India, Cabinet Secretariat letter No. 84/13/CF-64 dated 16th April, 1964 (Appendix XI) for major establishments and laboratories in the R. & D. Organisation. They hope that after the introduction of Model Constitution in the Establishments and Laboratories and the formation of Governing Councils for them, the workload at the Headquarters will be considerably reduced necessitating a further review of the staff position (both technical and administrative) at the Headquarters.

C. Administrative Pattern of the Laboratories/Establishments

53. The Committee wanted to know what percentage of the total expenditure of each Defence Research and Development Laboratory/Establishment was incurred on administration. In a written note, the Ministry of Defence has stated that: "As compilation of expenditure for the entire Research and Development Organisation is done with reference to the prescribed code heads, like pay and allowances of various classes of personnel (e.g. Service Officers, Civilian Gazetted Officers), purchase of stores, etc., figures of expenditure which may be regarded as purely on 'Administration' are not available." They have, however, furnished a statement* showing the approximate percentage of expenditure on account of administrative personnel in each Establishment in relation to the total expenditure, which is reproduced below:—

Category (a)—Well Established Laboratories	Approximate Percentage
Armament Research & Development Establishment	12·2
Explosives Research & Development Laboratory	11·8
Defence Research & Development Laboratory	12·9
Terminal Ballistics Research Laboratory	10·4
Electronics and Radar Development Establishment	9·0
Defence Electronics Research Laboratory	11·3
Aeronautical Development Establishment	11·6

*The Ministry have stated at the stage of factual verification that the statement exhibits the percentage of only pay and allowances of administrative staff (including T.A., D.A. and contingencies) to the total expenditure including capital expenditure. Even the pay and allowances of the administrative staff was worked out by adopting *ad hoc* basis.

1	2
Gas Turbine Research Establishment	10·2
Defence Science Laboratory, Delhi	12·1
Defence Laboratory (Jodhpur)	12·8
Defence Food Research Laboratory	11·5
Naval Chemical & Metallurgical Laboratory	14·5
Indian Naval Physical Laboratory	9·8
Fire Service Research & Development Training Establishment	13·7
<i>Category (b).—Recently formed and in the state of build-up or where Establishments have been reviewed</i>	
Instruments Research & Development Establishment	16·5
Research & Development Establishment (Engineers).	14·1
Solid State Physics Laboratory	15·5
Defence Research Laboratory (Materials)	17·9
Defence Institute of Physiology & Allied Sciences	18·4
Institute of Nuclear Medicine & Allied Sciences.	13·4
<i>Category (c)—Establishments/Laboratories with special features</i>	
Institute of Work Study	40·00
Proof & Experimental Establishment	5·7
Defence Metallurgical Research Laboratory	7·3
Institute of Armament Technology	17·8

A statement showing the percentage of expenditure on administration to the total recurring expenditure on each R. & D. Establishment/Laboratory during the Third Five Year Plan is given in Appendix XV.*

During the course of evidence the Scientific Adviser has stated that what should come under administrative expenditure is a debatable point; but even when liberally interpreted such expenditure "goes beyond 20 per cent, I always think that there is something

*At the stage of factual verification the Ministry have stated that the table appearing in Appendix XV exhibits percentages of the actual administrative expenditure (as opposed to the approximate figures given previously on an *ad hoc* basis), and it includes T.A., D.A. and contingencies, etc. relating to Administration, to the recurring expenditure, *viz.*, total expenditure minus cost of capital items of expenditure. The Ministry have furnished a revised statement showing the percentages of expenditure on administrative staff (pay and allowances only) *vis-a-vis* the total staff (Pay and allowances only) which is at Appendix XVI.

wrong." He has added that the Institute of Work Study was asked to look into the matter but they wanted more staff for undertaking such a review.

The Secretary, Ministry of Defence has admitted during evidence that the percentage of expenditure on administrative staff is on the high side. He has further stated that the staffing pattern would be looked into by another body, not necessarily by the Institute of Work Study.

The Committee note from the statement given in the Appendix XV that the percentage of expenditure on administration to the total recurring expenditure in certain laboratories/establishments exceeds 20 per cent and, in some cases (excluding training establishments), it has exceeded 30 per cent. The Committee would stress the need for reduction in administrative expenditure, which is on the high side.

The Committee also suggest that the Ministry may lay down definite ceilings in regard to the percentage of administrative staff vis-a-vis the total staff as also the percentage of expenditure on administrative personnel in each laboratory/establishment. The Committee also suggest that before laying down the ceilings the Ministry may ascertain the position obtaining in C.S.I.R. laboratories and similar organisations in the U.K. and other advanced countries. In this connection, the Committee would also like to invite the attention of the Ministry to the observations/recommendations made by them in para 19 of their 95th Report (March, 1966) (Third Lok Sabha) on the Ministry of Defence: Defence Research and Development Organisation—Electronics and Radar Development Establishment Bangalore.

D. Administrative and Financial Powers

54. It has been stated that the Directors at Headquarters have not been vested with any administrative and financial powers. However, for the duration of the emergency they have been authorised under Government orders to sanction development projects costing upto Rs. 50,000. This power is operative upto 31st July, 1967 and is being further extended. Powers of Heads of Research Establishments/Laboratories for projects are:—

Study projects costing	..	Rs. 10,000
Other projects costing	..	Rs. 20,000

As a result of the proposals put forward by the Defence R. & D. Organisation, the Government have accepted enhancement/vesting of powers in respect of a few items *vide* Ministry of Defence letter No. 93916|RD-26|11088|D(R&D) dated 31st October, 1966 (Appendix XVII). Some other items are still under discussion. Besides, excepting two small establishments the status of the Heads (wherever Deputy Chief Scientific Officers or Principal Scientific Officers were authorised) has now been upgraded to Director Grade II. A statement showing Establishments/Laboratories headed by Officers of different Grades is given in Appendix XVIII.

A view has been expressed to the Committee that though the Director of Establishment/Laboratory has power, he is chary of giving power to his subordinates. It has been suggested that there should be devolution of responsibility right from top to the worker at the bench. The Ministry has, however, stated that so far as the question relates to Administrative/financial powers, provision exists already for authorising administrative officers or another officer not below the rank of S.S.O. I to exercise the powers. This has again been brought to the notice of all Establishments for necessary action. The Ministry has further stated that the question of progressive decentralisation of responsibility and delegation of as much authority as possible from the Scientific Adviser to the Technical Directors and to the Heads of Establishments is linked up with the introduction of the Model Constitution.

The Committee have been informed that Heads of Establishments have with effect from 31st October, 1966 been vested with powers to sanction upto 3 advance increments at the time of recruitment of Class III non-gazetted staff on the recommendation of the Selection Committee.

The Committee are glad to know that the Director of Laboratory/Establishment has been vested with increased powers in respect of certain items and that the question of vesting powers in respect of other items is still under consideration. The Committee hope that there will be progressive decentralisation of responsibility and delegation of as much authority as possible from the Scientific Adviser to the Technical Directors and to the Directors of Establishments/Laboratories. The Committee would like to urge that the Director of an Establishment/Laboratory should on his part, delegate adequate financial/administrative powers to the Administrative Officer so that he may be relieved of the routine administrative work and may devote greater part of his time to the performance of technical duties.

E. Defence Science Service

55. The Defence Science Service was constituted in 1953 and is now an established Central Service with permanent pensionable posts. The Gazetted Civilian Scientific personnel of the Defence R. & D. Organisation belong to this Service. A statement showing the scales of pay and method of recruitment and avenues of promotion of the scientists working in the Defence R. & D. Organisation is given below:—

Name of the Post	Pay Scale	Method of Recruitment and avenues of promotion.
Junior Scientific Officer	350-25-500-590-EB-30-800-EB-30-830-35-900.	Vacancies in the various grades are filled both by promotion and direct recruitment.
Senior Scientific Officer Gr. II/ Lecturer	400-40-800-50-950	
Senior Scientific Officer Gr. I/ Assistant Statistical Officer.	700-50-1250	Direct recruitment is made through the UPSC. Promotions are made in accordance with the recommendations of a Departmental Promotion Committee under the Chairmanship of a Member of UPSC in the case of Class I posts and of Scientific Adviser in the case of Class II posts respectively.
Principal Scientific Officer/ Professor	1100-50-1200-100-1500	
*Superintendent Development Grade I	1300-60-1600	
Deputy Chief Scientific Officer	1300-60-1600-100-1800	
Director Grade II/Chief Psychologist.**:	1600-100-1900	
Director Grade I/Chief Scientist	2000-100-2500	

The Committee have been informed during the course of evidence that the Defence Science Service Rules are being revised and the considerations that have necessitated the revision of the rules are as under:—

- (i) The existing rules do not fully meet the requirements of expanding DSS. The general rules regarding seniority and promotion have to be modified in view of the peculiar nature of service which has to cater for a large number of fields in Science and Technology;

*Since abolished.

**Upgraded to Director grade I.

- (ii) the proportion of promotion quota from non-gazetted level to lowest gazetted category, viz. Junior Scientific Officer has been considered inadequate;
- (iii) desirability of extending pensionary benefits instead of Contributory Provident Fund; and
- (iv) desirability of including the other posts in the R. & D. Organisation, e.g. Director Grade I in the DSS Cadre.

It has been stated in a written note furnished to the Committee that a committee headed by Maj. Genl. J. R. Samson, Chief Controller of Research and Development and other high Service and Civilian Officers was constituted to review the career prospects of DSS Officers of the grades ranging from Junior Scientific Officers to the Principal Scientific Officers. It has also been stated that the brief prepared by that committee is at present under consideration. The Committee understand that the views of the Establishments/Laboratories and the Technical Directors of the Headquarters on the recommendations of the committee for rationalisation of pay-scales have since been received. But the question, which involves a major policy matter affecting a large number of cases, is under consideration.

The Committee attach great importance to the induction of talented young men into the Defence Science Service. The Committee cannot over-emphasize the importance of giving suitable incentives to the serving officers and also ensuring to them adequate career prospects within the organisation. The Committee hope that Government would take an early decision on the question of rationalisation of the scales of pay.

Criteria for Employment of Service Officers

56. Postings of service officers at R. & D. Headquarters and at the various R. & D. Establishments Laboratories are finalised on the basis of their suitability for the appointment which is judged by their technical qualifications and experience in the particular field of appointment. Different technical qualifications have been prescribed recently for the intake of service officers in the various divisions of the Organisation. The qualifications for tenure as well as for those permanently retained in the R. & D. and Inspection Organisations are given in Appendix XIX which will be applicable to fresh entrants.

The method of selection of officers for permanent secondment is as follows:—

- (i) After an officer has earned two confidential reports, his Director submits recommendation to R. & D. Headquarters whether the officer is fit for permanent retention;
- (ii) Taking into account the officer's technical background, competence for the job, his proven ability and needs of the organisation, approval of the head of the Organisation is obtained;
- (iii) The Director of the parent Arm/Service to which the officer belongs is consulted and his agreement obtained;
- (iv) The concerned officer is asked whether he is willing to be considered for permanent secondment;
- (v) The Defence Research and Development and Production Selection Board (headed by Secretary, Defence Production, and including the Director General of Inspection, Chief Controller, Research and Development and the Deputy Secretary of the Ministry of Defence as members) then considers the proposal for permanent secondment.

Initially all Service Officers in the R&D Organisation are posted on a tenure basis only. Officers who show a special flair, aptitude and suitability for research are retained permanently.

For initial appointments, the job requirements are drawn up and Services Headquarters concerned are requested to suggest a panel of names.

Selection is made out of the names received. The Defence Research and Development and Production Selection Board makes the final selection of officers of the rank equivalent rank of Lt. Col. and above. Officers upto and including the rank/equivalent rank of Major are selected by the Scientific Adviser.

It has been stated that in keeping with the principle of proper rotation of officers between the Services and Technical Organisations, only some percentage of Service Officers are permanently retained in the interests of continuity and effective conduct of technical work. The present policy is that upto 20 per cent of the officers' strength in the R&D Organisation could be drawn from the Services of whom 30 per cent could be permanently retained. The normal tenure is three years which may in rare cases go upto four years.

According to the latest decision of the Government, selection for permanent retention in R&D and Inspection Organisations will be made from amongst the tenure officers who have:

- (a) done at least two years as Lt. Col. or equivalent in the acting or substantive rank;
- (b) completed 2 years service in their second tenure in one or both (R&D and Inspection) Organisations;
- (c) fulfil the qualifications laid down for the various Technical Division as shown in Col. 2(b) of Appendix XIX.

It has been stated that the terms and conditions of service officers in R. & D. Organisation including the above decisions regarding permanent retention are under finalisation and rules regarding this are yet to be issued.

In reply to a question as to why the U.P.S.C. is not associated with the final selection of service officers as is done in the case of recruitment of the Civilian Scientists in the Defence R&D Organisation, the Secretary of the Ministry of Defence has stated as under:—

“The Selection Board only makes recommendations for permanent secondment of Service Officers who are already commissioned officers. Now once the U.P.S.C. has taken on a Class I Officer, you can post him anywhere. It is not necessary to associate the UPSC once he has been selected. This is just secondment of an already selected officer. The civilian scientists do not come under this Board, which is really Research and Development and Inspection Selection Board for Service Officers.”

The Committee note the methods of secondment and permanent retention of service officers in the R&D Organisation. The Committee feel that in view of the specialised and technical nature of the work which the Service Officers are expected to perform, selection has to be made very carefully keeping in view the scientific attainment and experience of the officers concerned. The Committee also feel it necessary to associate a representative of the U.P.S.C. with the Defence Research and Development and Production Selection Board before the selection of service officers for permanent retention in the R&D Organisation is made.

F. Civilian & Service Officers

57. It has been represented to the Committee that “there is lot of unhealthy rivalry and distrust among the ‘civilian’ and ‘service’

officers. This detracts from the value of the contribution towards the research and development."

Asked to offer his views on this matter the Scientific Adviser stated during evidence that:

"Till recently there was some difficulty because their career avenues were not clearly marked. Now we have taken steps to mark out career avenues. Certain number of posts are clearly earmarked for service officers and certain others for civilians so that there is no unhealthy competition by way of wanting to occupy the same post by both. Service conditions have been laid down distinctly. Further as time goes on, they are gradually learning that each of them has got a place and each one has to work with the other. In fact this has been emphasised in various addresses in the annual conferences."

The Secretary, Defence Production, has stated that during the last two years he has not seen any signs of discontentment or open rivalry.

The Committee note that there is now no open unhealthy rivalry between the Service and Civilian Officers. They would, therefore, stress that utmost vigilance be exercised in the matter and all cases of covert or overt rivalry promptly investigated and necessary remedial action taken so that the work of the Organisation does not suffer. The Committee would like to emphasise that the laboratories and the establishments should be manned by officers—Service or Civil—who are eminently qualified and experienced in the latest developments in the field of science so that an atmosphere could be created in which both Service and Civil elements could co-exist and cooperate for the benefit of the Organisation.

G. Recruitment and Promotion of Staff

58. As stated earlier, the Service Officers are either permanently seconded to the R. & D. Organisation or they serve on a tenure basis. In the case of permanently seconded officers, their promotions are considered and approved by the R&D and Production Selection Board. The grades of pay, allowances, etc. for Service Officers who serve in the R&D Organisation are the same as those applicable to them in their own Services.

Civilian Gazetted Officers

Under the U.P.S.C. Consultation Rules, appointments in the gazetted grades of Scientific/Technical Officers and also adminis-

trative and stores officer which are of more than 12 months duration are filled in consultation with U.P.S.C. In case of gazetted appointments of and above the level of Senior Scientific Officer Grade II, only those appointments are released for recruitment which cannot be filled by departmental promotion.

Non-Gazetted Officers

33-1/3% of the vacancies in the selection posts of the non-gazetted scientific/technical staff are filled by direct recruitment through Employment Exchange, failing which by advertisement. 33-1/3% of the vacancies of Junior Scientific Assistants (non-selection posts) are also filled by direct recruitment.

Industrial staff

59. Industrial posts are created for one year upto the limit of Rs. 2500 per sanction by the Head of an R&D Establishment within the budget provision. The pay scales are as prescribed in the Revised Pay Rules for R&D Organisation. Heads of R&D Establishments are competent to fill these posts locally through Employment Exchange and every vacancy is required to be notified to the Employment Exchange as laid down in Employment Exchange (Compulsory Notification of Vacancies) Act, 1959. Direct recruitment in intermediary grade is resorted to only when the vacancies cannot be filled by promotion of persons serving in the next lower grade (in the direct line of promotion) in the same establishment.

A statement giving the average time taken at each stage from the stage of notifying the vacancies to the U.P.S.C. to the stage of taking up the appointment by selected persons is given in Appendix XX. The Committee have been informed that the procedure for recruitment is neither dilatory nor cumbersome but it is time consuming because it has to go through several stages.

The Committee note that the average time taken from the advertisement of a Defence Science Service post by U.P.S.C. to the appointment of a person from outside is about one year. The Committee consider this time-lag to be rather excessive. The Committee would urge that steps should be taken to reduce this time-lag so that a candidate for a DSS post could be appointed within a period of six months from the date of the advertisement. The Committee also consider that due to administrative delay the period of seven to eight months taken for the selection of a departmental candidate is also on the high side. This period should also be reduced.

Promotion

60. Promotions of civilian gazetted officers are considered by a Departmental Promotion Committee presided over by a Member of U.P.S.C. Promotions of non-gazetted officers to gazetted posts are considered by another Departmental Promotion Committee presided over by the Scientific Adviser. Promotions to and above the rank of Senior Scientific Officers Grade I are made from among the approved panel of Departmental candidates and only such of the vacancies which cannot be filled by promotion or which require specialised qualifications are released to U.P.S.C. for direct recruitment.

The Committee have been informed that in so far as the posts of scientific/technical officers (DSS) are concerned, the percentage between promotion/direct recruitment has now been fixed in the following grades as under:—

Grade	By Promotion	By recruitment Through U. P. S. C.
SSO—II	50	50
JSO	50	50

Apprentices are also selected by the U.P.S.C. in the above grades. They are absorbed within the recruitment quota specified above.

No percentage between promotions and recruitment has been fixed in the grades of SSO-I.P.Sc. DCSO and Director Gde. II. Posts are filled by DPC or through U.P.S.C. depending on job requirement. The posts of Directors Grade I are filled through U.P.S.C.

In the R&D Organisation as a whole, there were the following posts of (i) Scientific/Technical Officers; (ii) Scientific/Technical staff (non-Gazetted) as on 1.4.1966:

	Sanctioned	Actual
(i) Scientific/Technical Officers.	1161	922
(ii) Scientific/Technical Staff (Non-Gazetted)	3119	2355

The Ministry have advanced the following reasons for the large number of vacancies of scientific/technical officers and staff:

- (i) Posts are filled by promotion/recruitment which is normally a lengthy process. Qualified scientists in certain specialised fields are difficult to procure. Normally the time lag in appointing a qualified scientist ranges between 8 and 12 months.
- (ii) Posts are sanctioned on the basis of projects already undertaken/likely to be undertaken. These are to be filled on "as required basis." Sometimes posts are not filled because necessary apparatus/machinery required to be imported takes a long time to arrive.
- (iii) Majority of the vacant posts is filled/being filled by promotion, recruitment and Apprenticeship Training Scheme.
- (iv) Two third of the non-Gazetted Scientific/Technical posts are filled by promotion on the recommendations of DPCs and the remaining one third by direct recruitment including open advertisement, Apprentices recruited under the Apprenticeship Training Scheme are appointed against the direct recruitment quota. In case some vacancies earmarked for promotion remain unfilled for want of suitable departmental candidates, direct recruitment is resorted to.

As regards the large number of vacancies in non-gazetted Scientific/Technical staff lying unfilled on 1.4.1966, the Ministry have furnished the following reasons:—

- (i) ACRs on the non-gazetted staff are rendered by February 15. It is always after the receipt of the ACRs that a meeting of the DPC concerned is fixed and panels drawn for filling existing vacancies by promotion.
- (ii) PEs of certain Establishments/Laboratories have been sanctioned on phased scale. The total posts sanctioned are filled from year to year depending on the work load/intake of new projects.
- (iii) With regard to the posts to be filled by direct recruitment, the existing recruitment procedure, especially for filling reserved posts, takes a long time before a person is actually in position. While every effort is made to cut short the time lag as much as possible, such (reserved) vacancies take a long time to fill.

The Ministry have also informed the Committee that as against 2355 posts shown as filled as on 1.4.66 the number of posts filled as on 1.10.1966 was 2479.

The Committee are concerned to note the large number of vacancies in the category of Scientific/Technical Officers (Gazetted and non-Gazetted) in the Defence R. & D. Organisation. They feel that administrative delays involving recruitment of technical hands can be avoided with proper planning at all levels. As regards the availability of technical/scientific personnel, the Committee would like to invite the attention of the Ministry to the recommendation contained in para 32 of their 94th Report on the Ministry of Defence: Defence Research and Development Organisation—Defence Metallurgical Research Laboratory, Hyderabad.

Promotion on the basis of Subject-Group

61. Full subject-wise details of departmental promotion to the grade of JSO during the last three years are given below:

Subject	Number of promotions
Metallurgy .	1
Armaments .	14
Explosives .	7
Electronics .	34
Engineering .	7
Flight Science	5
Nuclear Science	2
Chemistry	14
Biology	4
Physics	10
Physiology	8
Psychology	1
Maths & Stats	19
Oceanography	2
Scientific Information and Technical Documentation	16
General Stores . . . . .	..
Textiles, . . . . .	..
TOTAL	144

On the 25th July, 1966, the following unstarred question was tabled in the Lok Sabha by Shri Vishram Prasad:

- “(a) whether it is a fact that 40 per cent of the vacancies in the posts of Junior Scientific Officers in the Research and Development Organisation are filled in by departmental promotions in each subject group;
- (b) whether it is also a fact that this percentage is not maintained in certain subject groups; and
- (c) if so, the names of such subject groups and the reasons therefor?”

The reply of the Minister of Defence Production (Shri A. M. Thomas) was as under:—

“40 per cent of the vacancies in the posts of JSOs in R & D are filled by departmental promotions on an overall basis but not subject-wise.

Some of the subject groups, where the above percentage is quit maintained, are:—

- (i) Metallurgy.
- (ii) Instrumentation.
- (iii) Engineering.
- (iv) Flight Sciences.
- (v) Nuclear Medicine etc.

The main reasons are:—

- (I) The posts are not sanctioned subject-wise and the vacancies are filled on ‘as required’ basis.
- (II) In some fields, even when vacancies are available, departmental candidates suitably qualified by way of experience etc. are not available.”

When the Committee wanted to know whether the policy of departmental promotions in the Defence Research and Development Organisation on an overall basis but not on subject-wise basis has resulted in some discrimination, the Scientific Adviser stated during evidence that in an organisation like the Defence Science “every subject cannot get the same treatment because the needs and requirements of the job have to be borne in mind. A chemist cannot do the job of a metallurgist; a metallurgist cannot do the job of a statistician and so on. The choice which a man makes in his career, to some extent, determines his prospects.”

Asked further whether anything can be done to mitigate the grievance of a Junior Scientific Officer who does not get promotion when another man in a different group gets it, the Scientific Adviser replies that "this is a human problem and to the extent possible I keep an eye on such cases. We do our best to see that frustration could be eliminated."

In a written note, the Ministry has further stated that "the posts are sanctioned on the basis of projects already undertaken/likely to be undertaken by the Scientists. Posts cannot, therefore, be sanctioned subject-wise as in all projects Scientists of different subjects are normally engaged as a team. It is also not, therefore, feasible to maintain the percentage subject-wise although efforts are made to maintain it as far as possible."

While the Committee realise the difficulties of the R. & D. Organisation, they nevertheless feel that expansion programmes of the Organisation should be formulated in such a manner that persons in none of the groups remain dissatisfied. The Committee also suggest that the feasibility of introducing a system of timescale promotion and promotion by merit upto the grade of Senior Scientific Officers may be considered.

Incentives to staff

62. In the Defence Research and Development Organisation, the incentives provided to the civilian scientists and Service technologists are two-fold:

- (a) Incentives inherent in work i.e., job satisfaction, and
- (b) Financial incentives.

As the R&D Organisation is devoted to applied research, development work and a small amount of basic research of the aimed type, the placement of the individuals is normally made according to their specialisation and aptitude. Further, selected scientists are sent for higher training, within India and abroad in their specialised fields and are also encouraged to produce original thesis for the award of post-graduate degrees by Universities in India. Subject to the normal security precautions, they have the freedom to publish the results of their work in professional journals in India and abroad. Another form of encouragement to R&D personnel is to consider suitable inventions/important processes developed by them in the course of their normal work for patenting. In every such case, it is considered whether it would be in the interest of the government to take out the patent. If so, the patent is applied for in the name

of the Head of the Department. The application for taking out the patent includes a declaration from the actual inventor assigning his invention to the Government. Where it is considered that a patent will be of no interest to the Government, the inventor is allowed to take out the patent if he so desires in his own name.

Regarding financial incentives, civilian scientists, apart from being provided with a planned career in the Defence Science Service, are considered for advanced increments depending upon the outstanding work carried out by them. Besides, R. & D. personnel, both civilian and Service, are eligible for cash awards and commendation certificates for original ideas, inventiveness and suggestions leading to the better utilisation of existing stores and improvement in working procedures resulting in economy in men, materials and time.

The Committee have been informed that the number of R&D personnel who were granted cash awards during the years 1963-64, 1964-65 and 1965-66 is as under:—

1963-64	..	20
1964-65	..	Nil
1965-66	..	9

It has also been stated that no commendation certificates were issued to the R&D personnel during the last three years.

In a written note the Ministry has informed the Committee that during the last three years, it was only in 1963-64 that 7 scientists were given advance increments.

Asked to state the number of officers in higher cadres (minimum grade not less than Rs. 350) who resigned their posts in the Defence R&D Organisation, the Ministry of Defence have furnished the following figures:

<i>Year</i>	<i>No. of Officers Resigned</i>	
1965	..	16
1966	..	14

The Committee are glad to note the various incentives that are being provided to the Civilian Scientists and to the Service Technologists in the Defence R. & D. Organisation. They, however, are concerned to note the number of scientists who have resigned their jobs in the Organisation during the last two years. The Committee feel that keeping the staff satisfied plays a great part in the successful running of a research organisation. A research organisation like this should provide adequate incentives to the scientists so that

they do not seek their prospects outside the Organisation. The Committee feel that a Junior Scientist needs some encouragement in terms of money but what he will value much more is better facilities, better opportunities for work and better treatment. The Committee suggest that in order to sustain and inspire a young talented scientist, he may be entrusted with independent charge of a certain project so that he can develop self-confidence and initiative.

CHAPTER VI

BUDGET AND ACCOUNTS AND FIVE YEAR PLANS

A. Procedure for formulating Budget Estimates

63. The procedure for formulating and approving budget proposals is as under:

Phase VI

Establishments submit to the respective Technical Directors by 15th April proposals covering (i) projects to be undertaken; (ii) Pilot Plants proposed to be installed; (iii) Purchase of equipment, machinery and stores not involving foreign exchange; and (iv) Purchase of equipment, stores and other items involving foreign exchange, arranged priority-wise.

Phase II

The technical Directors then examine the proposals and tie up the requirements of the Users with the facilities available in the laboratories. By 15th May Laboratories are advised by the Technical Director of the items recommended for inclusion in the Forecast Budget Estimates. Based on the recommendations of the Technical Director, Forecast Budget Estimates are finalised by Laboratories and forwarded to Headquarters by 15th June.

Phase III

On the receipt of the final Forecast Budget Estimates from Laboratories, a critical examination is done by the Director of Administration and amounts recommended for provision under each detailed head are put up to the Deputy Chief Scientist/Chief Controller, Research and Development for acceptance, with reasons for variations.

Phase IV

After acceptance by the Deputy Chief Scientist/Chief Controller, Research and Development, the estimates of the various Establishments/Laboratories and the Headquarters are consolidated and Scientific Adviser's approval obtained.

Phase V

Consolidated estimates are sent to the Ministry of Finance (Defence) through the Defence Production Department.

Phase VI

With the comments of the Ministry of Finance (Defence) the estimates are placed before the R & D Council. If the latter approves the estimates, the same are submitted to the Ministries of Defence and Finance (Defence) for final approval.

The following steps are stated to have been taken to improve the formulation of the Annual Budget:

- (i) Building works programme for the Laboratories are being considered on a five-year basis.
- (ii) Over-all plan for training defence scientists both in the country and abroad are being considered on a long-term basis.
- (iii) Tasks assigned to each Laboratory are approved in broad terms on a five-year basis.
- (iv) It is ensured that effective use is made of the technical manpower.

Budget Estimates

64. The budgeted and actual expenditure of the Defence Research and Development Organisation from the year 1961-62 onwards is given below:

	(Rs. in lakhs)					
	Budget			Actual Expenditure		
	Revenue	Works (Major & Minor)	Total	Revenue	Works (Major & minor)	Total
1961-62	279.00	43.00	322.00	286.19	28.28	314.47
1962-63	378.70	52.00	430.70	416.13	107.88	524.01
1963-64	499.00	210.00	709.00	533.53	202.60	736.13
1964-65	584.30	305.00	889.30	611.36	227.96	839.32
1965-66	738.45	265.00	1003.45	726.85	246.25	973.10
1966-67	939.54	301.20	1240.74			1140.27 (upto March Final).

A break-up of Rs. 939.54 lakhs is given below:—

Budget Sub-head	Amount (In lakhs of Rs.).
1. Pay & Allowances—Service Officers	34.00
2. Pay & Allowances—Other Ranks	11.00
3. Pay and Allowances—Civilian Officers	108.50
4. Pay & Allowances—Civilian others	240.00
5. Pay & Allowances—Industrial Estt.	92.00
6. Miscellaneous Charges	25.00
7. Movement of personnel	13.00
8. Movement of Stores	4.50
9. Grant of fellowships/stipends	12.72
10. Grants-in-aid	11.22
11. Training abroad (other than UK)	1.00
12. Purchase of material	375.00
13. Pay & Miscellaneous Charges in U.K.	1.60
14. Stores for India in U.K.	10.00
TOTAL	939.54

The provision of Rs. 375 lakhs for purchase of material is intended for payments for procurement of stores (other than U.K.) by local purchase through Central procuring agencies like Director General, Supply and Disposal, Indian Supply Mission, Washington as well as Service Depots (Ordnance Depots, Supply Depots) and Ordnance factories. The stores are intended to cover (i) build up facilities like Workshops etc., (ii) maintenance consumable items, spare parts, components, etc., (iii) for projects, development Contracts and pilot plants. The sum of Rs. 375 lakhs is divided into two parts—one for local purchase expenditure (Rs. 226.00 lakhs) and the other Central Purchase (Rs. 149 lakhs).

The break-up of Rs. 226.00 lakhs is as under:

(1) To acquire tangible assets i.e. machinery & equipment	Rs. 51.00 lakhs.
(2) Maintenance	Rs. 22.00 lakhs.
(3) Projects, Pilot plants.	Rs. 153.00 lakhs.

The sum of Rs. 149 lakhs is the estimated materialisation of stores (primarily in respect of indents already placed in the past and a small portion of the emergent indents that may be placed) through all the Central procuring agencies. The total volumes of

indents placed and outstanding at the beginning of the year 1966 is about Rs. 235.00 lakhs. The list of projects (both new and carry over) were critically examined and pruned by the Headquarters. The projects are all Panel-approved.

The Committee note the procedures for the formulation of budget estimates of the Defence Research and Development Organisation. They also note the provision for procurement of stores in India and abroad. The Committee feel concerned that indents to the extent of Rs. 235 lakhs were outstanding at the beginning of the year (1966) and only indents worth Rs. 149 lakhs were expected to be materialised during the course of the year. The Committee cannot too strongly emphasise the need for expediting the purchases which are being effected by the Defence R. & D. Organisation through the agencies of India Supply Mission, Washington, Director General, Supply and Disposal, and the Ordnance Depots.

B. Research and Development Works

65. In matters concerning the preparation of Works Plans, R&D Organisation follows the Works Procedure prescribed for the Army. Based on the Five Year Planned Programme drawn by the R&D Headquarters for all the User Establishments and taking into consideration the priority allotted for their execution, the Establishments are intimated well in advance by the Headquarters to initiate the project. It envisages the working out of details by the User Establishments based on the scales of entitlement prescribed in various Government orders for Administrative purposes, living and storage accommodation and on the basis of actual necessity for laboratory and technological buildings. These projects are scrutinised at R&D Headquarters and only such projects are progressed, the necessity of which is accepted in principle by the Scientific Adviser. The time schedule, for processing the projects through User Racee Board, submission to CFA for acceptance of necessity, convening of Sitting Board, preparation of Estimates by Engineers and upto the issue of Administrative Approval, is drawn by R&D Headquarters in consultation with E-in-C's Branch.

Preparation of Works Plans and the processing of individual works projects until its sanction pertaining to Capital Works, is handled exclusively by R&D Headquarters. The responsibility of R&D Establishments is restricted to sponsoring of the proposal with full justification of necessity from User and research point of view. The Engineer Officer at R&D Headquarters viz. Deputy Director (Works) renders all technical help to the User Establishments in initial formulation of their works demand.

Works Plans

66. It has been stated that a Five Year Plan for R&D Works Projects for the years 1964-65 to 1968-69 was prepared sometime in 1964 but the same had to be revised to conform to the Official Five Year Plan period viz. 1966-67 to 1971-72. No approved Plan for R&D Works as such was thus in force during the currency of Third Five Year Plan representing the period from 1961-62 to 1965-66. However, the cost of the works which were under execution during the different years and the actual expenditure incurred yearwise is given below. The target to be achieved and the percentage of physical completion has been calculated on the basis of budget allocation for the year and the actual expenditure incurred:

Year	Residual value of carry over works and sanctioned amount of new works (Rs. in lakhs).	Budget allotment (Rs. in lakhs)	Target in terms of sanctioned budget	Actual expenditure (Rs. in lakhs)	Physical target achieved
(1)	(2)	(3)	(4)	(5)	(6)
1961-62	95.01	40.00	42%	24.57	26%
1962-63	735.00	47.00	6%	192.24	14%
1963-64	714.58	200.00	28%	195.68	27%
1964-65	585.54	300.00	51%	211.67	36%
1965-66	591.83	235.00	40%	221.73	37%

The Ministry has stated that except for the years 1961-62 and 1964-65 the shortfalls have been generally of the order of 1 per cent to 3 per cent which is rather negligible. As regards comparatively higher shortfalls during the year 1961-62 and 1964-65 the same is mainly due to the fact that certain works for which funds had been allocated on the expectation of their sanction did not materialise. Certain other factors like late release and slow progress of works and retendering were also partially responsible for these shortfalls. Remedial measures have since been taken to avoid the recurrence of these shortfalls by streamlining the existing procedure.

The Committee regret to note the heavy shortfall between the budget allotted and physical targets achieved in respect of R&D Works during 1961-62 and 1964-65, caused by non-materialisation of sanctions, late release of stores etc., slow progress of works and retendering etc. The Committee suggest that the remedial measures taken by Government to avoid the recurrence of these shortfalls should also include realistic budgetary allotment on works projects in addition to plugging the loopholes in the existing procedure of works administration.

C. Defence Fourth Five Year Plan

67. The Committee have been informed that a broad programme of R&D Schemes to be implemented during the next five years from 1966-67 to 1971-72 has been formulated keeping in view the R&D base, technological gaps and other problems areas. These research and development schemes are only indicative of the broad areas in which R&D effort would be emphasised during the next five years and as such are only qualitative and, therefore, no formal physical targets can be laid down for the different fields. It has been stated that all R&D Establishments/Laboratories have been asked to draw up their respective five-year Plans of works concerning Defence R&D tasks that are proposed to be undertaken, progressed and completed in their respective spheres of activity taking into account competence resources and the equipment that would be received by each of them.

Taking into account the R&D Schemes in hand, and those proposed to be launched during the next five years, it is anticipated that the financial outlay required for the purpose would be of the order of Rs. 85 crores, out of which Rs. 15 crores would be by way of capital cost and Rs. 70 crores recurring expenditure. The expenditure on foreign exchange out of the total amount would be of the order of Rs. 10 crores (capital Rs. 2.5 crores and recurring Rs. 7.5 crores).

The Committee have also been informed that it is not possible at this stage to give an indication of the percentage of machinery and equipment that would have to be imported and/or otherwise obtained from indigenous resources. Similarly, it is not possible to indicate the foreign countries from which machinery and equipment would be procured during the period 1966-67 to 1971-72. The general policy followed in this regard, however, is to restrict import of machinery and equipment to the barest minimum and, as far as possible, to procure same from countries where free foreign exchange is not involved.

The Committee note with concern that the Fourth Plan proposals of the Defence Research and Development Organisation indicate only the broad areas in which R. & D. effort will be intensified and do not specify the projects in accordance with their relative significance from the point of view of defence, import substitutions, development of indigenous know-how, etc. The Committee feel that the Planning Commission which is concerned with allocation of resources as also the Defence Research and Development Council which is to apportion the available resources among the different units, should be provided well in advance with such vital statistics as number of projects proposed to be taken up under various Laboratories/Establishments and their significance in national economy, the physical targets, the percentage of machinery and equipment that would have to be imported, the extent of import substitution likely to be achieved, etc. so that it could be possible for the planners to examine the programme of each Laboratory/Establishment on a realistic basis in the context of national economy.

CHAPTER VII

FOREIGN EXCHANGE AND IMPORT SUBSTITUTION

A. Foreign Exchange

68. Details of the foreign exchange allotted to and the amount actually utilised by the Defence R&D Organisation since 1961-62, yearwise and the amount of foreign exchange that lapsed during each of these years are given below:

	Allocation	Utilisation
		(In lakhs of Rupees)
1961-62	24.70	28.22
1962-63	70.18	56.39
1963-64	67.37	68.61
1964-65	103.00	105.72
1965-66	75.00	90.34

It has been stated that the unspent balance of foreign exchange during 1962-63 was withdrawn by the Ministry of Defence due to the Chinese invasion. The requirement of foreign exchange during the Fourth Five Year Plan is expected to be of the order of Rs. 10 crores.

As regards the procedure for allocation of foreign exchange, it has been stated by the Ministry that the foreign exchange requirements are indicated separately by all Defence Research and Development Laboratories/Establishments in their forecast budget estimates for the ensuing year. These budget estimates are examined at the R&D Headquarters in consultation with the concerned Technical Directors, and also taking into account the current development tasks allocated to the Laboratories/Establishments, and the forecast requirements of foreign exchange are accordingly reduced or adjusted.

Under the present procedure it is not necessary to obtain concurrence of Ministry of Finance (Defence) for release of foreign exchange for procurement of stores. Secretary, Department of Defence Production, is authorised to sanction release of foreign exchange upto Rs. 8 lakhs in each case from within the periodical

allocation made to Ministry of Defence. When the foreign exchange required in individual cases of procurement of stores is more than Rs. 8 lakhs, clearance has to be obtained from the Department of Economic Affairs. After the release of foreign exchange has been sanctioned by Secretary, Department of Defence Production or by Department of Economic Affairs, as the case may be, each case is referred to Ministry of Finance (Defence) for noting the foreign exchange commitment.

The Ministry have further stated that the procedure for the utilisation of foreign exchange for procurement of stores is working satisfactorily.

The Committee are glad to note that the procedure for the sanction of foreign exchange has been streamlined. They also note with satisfaction the extent of utilisation of foreign exchange by the R&D Organisation. They would like to stress that where there are inescapable demands, there should be no obstacles in the release of foreign exchange.

B. Import Substitution

69. The Ministry has stated that "during the comparatively short span of existence, the Defence R&D Organisation has made a significant progress in various fields of Defence Research, and especially in the field of building up competence in the sphere of what is known as conventional armaments. So far as they are concerned, it may be stated that the Defence R&D, to a large extent, have the necessary competence to undertake problems that may be posed by the Services for immediate solution or as a long term policy plan.

In the field of Guided missiles, a beginning has been just made and the development and production facilities will have to be considerably augmented before the necessary impact can be made. It would be necessary, therefore, to depend on imported know-how and items for quite some time.

In the field of Electronics, considerable progress has been made, but in view of the spectacular advances which are taking place in this particular field abroad, it would perhaps not be possible to catch up unless the production base in the country is simultaneously enlarged. The Bhabha Committee has prepared a detailed plan of future action.

In the sphere of vehicles, with the competence and production capacity as already built up in the country together with the further build-up in the offing, a reasonable degree of self-sufficiency for

defence needs will soon be achieved, both in the soft as well as armoured vehicles. The build-up of further capacity expected to be achieved in the near future includes peak scale operations of the Heavy Vehicle Factory at Avadi and the Vehicle Factory at Jabalpur.

In the case of engineer equipment also, the position is by and large the same as in the case of vehicles. The industry required for development and production of engineer equipment is mostly available in the country and is generally coming forward to play its part willingly. With further build-up of competence in the near future in general metallurgical industry, particularly in certain directions like extrusion of strong aluminium alloys in very large sizes, adequate degree of self sufficiency is likely to be achieved.

So far as Defence requirement of general stores and clothing is concerned, considerable headway has been made over a long time and practically all stores needed are being produced indigenously."

The Ministry has stated that it is difficult to make a precise statement about the extent of savings in Defence expenditure as a result of the processes developed or the indigenous substitutes used by the Laboratories in the Research Laboratory Group. However, a broad idea may be given of the order of savings that may be regarded as having been effected so far on the basis of the firm orders which have been placed by the user services on the production agencies. On this basis, the savings in foreign exchange would be of the order of Rs. 89.26 crores as indicated below:

Armaments	..	Rs.	77.95 crores
Electronics		Rs.	5.83 crores
Engineering	.. ..	Rs.	5.27 crores
Aeronautics	.. ..	Rs.	0.21 crores

The Committee are glad to note the efforts of the Defence R&D Organisation with regard to import substitution and self-reliance in various fields of defence science and technology. The Committee consider that these efforts need not necessarily be limited within the organisation only. For complete defence preparedness it is necessary to create a sense of participation in the private sector also which may be called upon to meet the defence requirements in case of urgent necessity. The Committee would like to urge that it should be the endeavour of the Organisation to break the dependence on foreign equipment as early as possible.

CHAPTER VIII

PLANT AND EQUIPMENT

A. Equipment Schemes

70. It has been stated by the Ministry that within the qualitative framework of the programme of various R & D tasks envisaged to be undertaken during the Fourth Five Year Plan the various R & D Laboratories/Establishments have been asked to formulate their individual R & D schemes, programmes of research and development in their particular spheres of activity in more precise terms, taking into account competence resources and the equipment that would be needed by each one of them. The general policy followed in regard to the procurement of machinery and equipment from abroad however is to restrict its import to the barest minimum and, as far as possible to procure same from countries where free foreign exchange is not involved.

In a written note the Ministry have informed the Committee that to undertake fabrication of test equipment, plant and other accessories for day-to-day work is an accepted practice of all R & D Laboratories/Establishments. However, it has not been possible to furnish accurate figures on this account as no separate records are maintained with regard to this activity. Moreover, this would vary from one group of laboratories to another depending upon their respective fields of activities. For instance, in the case of aeronautical Group of laboratories, a very large proportion of the equipment required by them is of necessity to be imported. Similarly, in the case of the Electronic group of laboratories, the proportion of imported equipment on a rough estimate varies from 65 to 75 per cent and the remainder is obtained/fabricated from other indigenous sources in the country. On the other hand, in the case of the Engineering group, only about 30 per cent of the equipment required is imported from abroad and the rest is fabricated/obtained from indigenous sources.

During evidence, the Chief Controller, R&D has given a few instances of adaptation of the foreign equipment to Indian conditions. He added that efforts are made to standardise and adapt the foreign equipments and modify them with the help of Ordnance Factories.

B. Purchase of Stores machinery and equipment

71. The Ministry has explained the procedure for purchase of stores in the R & D Organisation as follows:—

- (i) **Items costing less than Rs. 10,000/-** are purchase by R & D Establishments by resorting to local purchase. If these purchases involve release of foreign exchange the procurement generally takes time as after release of the foreign exchange supply orders have to be placed and **import licenses** obtained and furnished to local dealers to enable them to import the items from abroad.
- (ii) Direct purchases from abroad through Directors General, **Indian Supply Mission, London and Washington** are permitted in respect of indents costing less than Rs. 25,000/- and provided no Indian agents of the manufacturers of the items are available in India. There is no delay in such cases and the position of procurement is satisfactory.
- (iii) Purchase through Director General, Supply and Disposal where the cost exceeds Rs. 25,000/- however do involve some delay. This delay is particularly evident in the case of items for which foreign exchange has to be released for import from abroad. The Director General, Supply and Disposal, at present has no powers to exceed the foreign exchange sanctioned and if for some reasons the amount sanctioned falls short of the amount quoted by the tenderer, which situation is not rare, in view of the ever increasing costs, the Director General, Supply and Disposal has again to approach the Headquarters for release of the additional foreign exchange. This necessitates the repetition of the process laid down for obtaining the release of foreign exchange.
- (iv) The local purchase powers of the Heads of R & D Establishments have been raised from Rs. 10,000/- to Rs. 20,000/- in October, 1966.
- (v) It has been decided in December, 1966 that procurement of equipments/stores costing less than Rs. 20,000/- and involving release of foreign exchange need not be referred to the Ministry of Finance (Defence) for concurrence from an expenditure angle. Such cases will now be sent direct to the Ministry of Defence for the release of foreign exchange. In case of R & D Projects sanctioned by competent authorities, concurrence by the Ministry of Finance

(Defence) is not necessary if the foreign exchange involved is less than Rs. 8 lakhs per item.

- (vi) Steps have been taken to obviate delays in R & D (*vide* copy of the circular No. 89500/1/RD. 29 (a) dated 31st October, 1966 see (Appendix XXI). Powers of the Heads of Establishments have been raised to Rs. 20,000/-. Formation of a Stores Purchase Committee for R & D Organisation is also under consideration of the Government.

Delay in the installation of equipment

72. It has been stated that cases arise where there is delay in installation of equipment and an example has been cited where about 67 items forming a set of instrumentation equipment with a total cost Rs. 11,15,784 which were received in parts prior to 1965 for setting up the range facilities at Terminal Ballistics Research Laboratory and their air conditioning to house instruments and (b) ing (a) completion of buildings at Terminal Ballistics Research Laboratory and their air conditioning to house instruments and (b) visit of camera engineers from USA and scientists to guide in the installation, use and maintenance of this equipment. In this connection the Scientific Adviser has stated that there was a gap between the arrival of the equipment and construction of the building.

In the course of their study visit to the Terminal Ballistics Research Laboratory in Chandigarh during June, 1967, the Study Group of the Estimates Committee were informed that the instrumentation equipment had been working satisfactorily. 13 major equipments were initially proposed to be obtained from abroad. Out of these 10 had been installed between June, 1966 and June, 1967. 3 more equipments were expected to be installed in August and December this year. The Study Group were also informed that the equipments already installed were working satisfactorily.

The Committee are glad to note the steps taken by Government to obviate delays in the matter of purchase of stores and equipment etc. for the Defence research laboratories. They hope that an early decision will be taken by Government on the question of setting up of a Stores Purchase Committee in the R. & D. Organisation as recommended by the Estimates Committee in Para 77 of their 94th Report (Third Lok Sabha).

They would, however, like to impress upon the Government the necessity of taking immediate steps to avoid delay in installation of equipments already purchased or imported at heavy cost. Delay in installation of a set of instrumentation equipment costing

Rs. 11,15,784 at Terminal Ballistics Research Laboratory is alarming. In para 58 of their 94th Report (Third Lok Sabha) the Committee had occasion to make an observation on the abnormal delay in purchasing and installing the Powder Metallurgy Plant in the Defence Metallurgical Research Laboratory, Hyderabad. They are constrained to observe that this is yet another instance of failure to instal the equipment immediately on receipt. They feel that the delay could have been avoided through proper planning and coordination of activities by the Defence R. & D. Organisation and other agencies concerned. The Committee hope that such cases will not arise in future.

CHAPTER IX

LIAISON WITH CSIR, UNIVERSITIES, AND OTHER SCIENTIFIC ORGANISATIONS

A. Defence Coordination Unit

73. The Committee have been informed that the Defence R&D Organisation maintains very close liaison with the CSIR and other scientific organisations for joint planning of programmes in common fields of work, in order to pool available resources to the maximum advantage. Such collaboration exists in all fields of scientific research and development of defence projects. For this purpose, CSIR representatives are nominated to various defence R&D Panels and R&D representatives serve on the executive councils of National Laboratories, to ensure that projects of common interest are suitably farmed out between the Defence R&D Organisation and the CSIR Laboratories.

A Defence Coordination Unit was set up by CSIR in December, 1962 to co-ordinate C.S.I.R. research and development programmes with those of the Defence requirements.

The functions of the Unit are broadly:

- (i) To maintain close coordination with various defence research, development and user organisations and departments with a view to ascertaining such problems of strategic importance which can be taken up by National Laboratories.
- (ii) To study, identify and allocate (with the approval of the Steering Committee) problems of Defence interest to one or more laboratories for research and development;
- (iii) To maintain progress cards on the projects undertaken at the initiative of the Defence Coordination Unit by the National Laboratories and in some cases by other agencies;
- (iv) To give such assistance as is required in regard to background information, collateral information, provision of necessary facilities for carrying out tests and user trials in Defence establishments and recommending sanction of funds including foreign exchange for creating better facilities in the laboratories for undertaking development/production in pilot scale, etc.;

- (v) To approach suitable industries and, if necessary, provide technical assistance for undertaking production of imported strategic items indigenously;
- (vi) To answer the technical queries received from the Defence R&D Organisation and its research establishments and various other technical directorates or other units of the Ministry Defence; and
- (vii) To prepare and submit progress reports on various projects of defence interest to the Steering Committee to obtain its guidance and act according to it.

The functions and activities of the Unit are guided by the Steering Committee for coordination of scientific research for Defence which was set up in December, 1962 by the President, CSIR, with the Director General, C.S.I.R. as Chairman and members representing Defence R&D Organisation, Director General, Armed Forces Medical Services, Department of Defence Supply, Master General of Ordnance, Director General, Technical Development, Director General, Supplies and Disposals, etc.

The Steering Committee is assisted by the following 10 Sub-Committees:

1. Explosives Chemicals;
2. General Chemicals;
3. Drugs and Pharmaceuticals;
4. Civil & Public Health Engineering;
5. Food;
6. Textiles, leather and timber;
7. Electronics;
8. Metals;
9. Petroleum, Oils and Lubricants;
10. Vehicles.

The Sub-Committees have experts/representatives from Defence R&D, Defence Inspection Organisation, Director General, Technical Development, Director General, Supplies and Disposal and various National Laboratories.

One of the main achievements of the Unit has been the establishment of close coordination between the CSIR and the National Laboratories on the one hand and the R&D and other various technical development establishments of the Ministry of Defence, on the other.

It has been stated that the Defence Coordination Unit, in collaboration with Defence R&D Organisation, periodically undertakes identification studies of imported strategic stores. These studies require careful assessment and scrutiny of relevant information available in literature and data collection on development of specific industries along with proposed expansion of their production capacities under the Plan, study of raw materials availability, various manufacturing processes involved and import and export statistics. As a result of these joint studies, it has been possible for the Unit to suggest/recommend undertaking research on problems which are feasible and thus eliminating to a large extent unproductive research on strategic items in various laboratories. At the meetings of the various Defence Research and Development Panels and Working Groups, the representatives of the Defence Coordination Unit apprise other members of the work being done by the CSIR laboratories and suggest ways and means of avoiding unnecessary duplication of research efforts between CSIR and Defence laboratories.

The Committee have been informed that the Unit acts almost as a focal point of scientific and technical problems of Defence interest in which National Laboratories can render assistance.

In December, 1962 at the instance of the Emergency Sub-Committee to the Scientific Advisory Committee of the Cabinet, 240 projects were referred to various National Laboratories. Some items were subsequently deleted and a few items were also added.

The position as on February 1966 was as follows:

Current Projects	175 (158 initiated by Defence and 17 suggested by CSIR).
Projects dropped	65

Details of stage of development of the projects are as follows:—

(i) Items for which Pilot Plants are being set up	14
(ii) Items for which know-how has been developed on laboratory scale	27
(iii) Items for which development work is in progress	90
(iv) No. of problems on which solution has been obtained and item produced on Pilot Plant Scale	27
	158

The Scientific Adviser has stated that "there are no terms and conditions specifically laid down for giving projects to C.S.I.R. Once a project is allotted to C.S.I.R., it is progressed as a project of their

own. But recently we found that they are not able to get the necessary foreign exchange. So I would say, broadly, the Indian part of the project cost is met from C.S.I.R. funds and wherever they are unable to give foreign exchange—which they are mostly unable to in many cases—then we arrange the foreign exchange. Beyond that there are no terms and conditions. Of course our men go and see the progress of the projects and we try to bring some pressure on them, but there are no other terms and conditions which are worth mentioning.”

When asked about the average time taken by the C.S.I.R. Laboratories/Institutes in providing solution to the problems referred to them by the R. & D. Organisation the Scientific Adviser stated:

“It is not possible to generalise the average time taken. Normally, we fix time targets and the C.S.I.R. have agreed to take up Defence problems on highest priority.

In some cases they have been able to do it. But in major cases they are also doing this work for the first time. I do not think they have been able to stick to the time targets because the time targets have been laid down by people who do not have any experience but on the whole they are doing well and they should certainly do much better.”

The Committee desired to know if there were projects in respect of which research was being carried on in more than one laboratory or in other words, about inter-laboratory collaboration. They have been informed that there are some inter-laboratory R. & D. Projects which are under execution in the Defence R. & D. Organisation.

The Scientific Adviser has explained during evidence that “Finance would not allow duplication of projects nor do we encourage it. If something is being done in one laboratory there is no point in doing it in another laboratory. But this does not apply uniformly. Something we have deliberately chosen one or two, I would say, probably, three or four very important projects where time is the essence, where there can be two different approaches and where we would like some little competition. But the lines they adopt may be different in the two different laboratories and we have done that.”

The Committee are glad to note that there is close liaison between the Defence R. & D. Organisation and the Council of Scientific and Industrial Research and the resources of the latter are being fully utilised for investigation of problems of strategic importance. The

Committee would suggest that directives should be issued to all the R. & D. Laboratories/Establishments to the effect that before any new project is taken up by them, they should first consult the Defence Coordination Unit with a view to ascertain whether work on same or similar problem is being or has been carried out at any of the C.S.I.R. Laboratories.

The Committee feel that since defence research and development cannot progress, severed from the main current of scientific and technical effort in the country and abroad, active effort must be made at all times to forge and develop closer liaison with the C.S.I.R. and other scientific organisations in the country. They recommend that more tasks which can be accomplished by the C.S.I.R. and National Laboratories should be given to them and the facilities for research should be utilised to the maximum extent possible. The defence Panels and Advisory Committees should however ensure that the tasks allocated are well defined and specific.

B. Collaboration with Indian Institutes of Technology and Universities, etc.

74. It has been stated that the steps for collaboration between the Defence Research and Development Organisation and Indian Institutes of Technology and University Colleges of Science and Technology include:

- (i) Organising symposia, seminars and panel discussions, where Defence scientists and scientists from Universities and Institutes are brought together. Symposia and seminars organised jointly with learned bodies like Operational Research Society of India, Indian Council of Medical Research, National Productivity Council of India, International Biological Programme, Commonwealth Defence Science Organisation, etc. may be mentioned in this connection;
- (ii) Assigning Defence projects to Universities and Institutes of Technology with financial support (Grants-in-Aid Scheme);
- (iii) Encouraging Defence Scientists to deliver lectures in their fields of specialisation at Universities and Institutes of Technology and *vice versa*.

- (iv) Inviting scientists from academic institutions including Fellows of National Institute of Sciences of India to visit Defence Laboratories to get acquainted with the problems of Defence Science and Technology;
- (v) Using the National Institute of Sciences of India as forum to bring together Defence Scientists and others from academic institutions for discussing problems of common interest; and
- (vi) Participation in the Summer Schools organised under the auspices of the University Grants Commission.

Symposia and Seminars

Symposia and seminars in scientific fields of common interest are frequently organised, often jointly with other learned societies. By way of illustration, a list of symposia/seminars held during 1965-66 is given below:

<i>Symposia/Seminars/Conference</i>	<i>Date</i>	<i>Place</i>
1. Symposium on 'Operational Research'	8-10 Feb. '65	Delhi
2. Symposium on 'Problems on High Altitude'.	15-20 Feb. '65	Poona
3. Symposium on 'Equipment Oriented Design and Development Technology in Defence R & D Organisation	25-28 Apr. '65	Bangalore
4. International Symposium on Human Adaptability	Sep. '65	Delhi
5. Symposium on 'Managerial Aspects of Work Study' .	7-8 Oct. '65.	Bombay
6. Symposium on 'Some Aspects of Defence Metallurgy'	13-16 Jan. '66	Hyderabad
7. Seminar on 'Nuclear Medicine'	12 Feb. '66	Delhi
8. Symposium on 'War Injuries with special reference to wounds sustained in the recent Indo-Pak. conflicts	14-19 Feb. '65	Poona

Such symposia/seminars etc. provide for fruitful exchange of ideas between R. & D. scientists and scientists from universities and other institutes on subjects of common interest.

The Ministry has stated that it has been proposed to hold four symposia during 1967 jointly with the National Institute of Sciences of India on (i) Operational Research; (ii) Ballistics; (ii) Infra-red and its application; and (iv) High Altitude Physiology.

Visits and Lectures

Distinguished scientists from universities and institutes including Fellows of National Institute of Sciences of India are frequently invited to visit R&D Laboratories and also deliver lectures on subjects of their specialisation.

Lectures were also delivered by R&D Scientists at various universities and Indian Institutes of Tecnology.

Group Discussions

The Committee have been informed that the Scientific Adviser has recently suggested to National Institute of Sciences of India to act as forum for organising group discussions between R&D Scientists and scientists in Civil Sector on subjects of common interest. The Council of National Institute of Sciences of India has accepted this suggestion and the first group discussion on rare chemicals is going to be organised shortly.

Summer Schools/Training Courses

The Ministry has stated that a post-graduate course on Radiation Medicine has been organised by Institute of Nuclear Medicine and Allied Sciences in collaboration with, Delhi University. Last year, Institute of Nuclear Medicine and Allied Sciences Participated in University Grants Commission Summer School on Medicine and organised a 2-day Course on radiation medicine.

A proposal to organise Summer Schools under the auspices of the University Grants Commission on subjects of Defence interest is under consideration. These Schools will be useful in exchange of ideas and for active participation of scientists in Universities and Institutes in Defence R&D efforts.

Membership of Committees and Panels, etc.

Membership of R&D Scientists in Committees, Panels, etc., on the civil side and civilian scientists in similar bodies in the R&D serve a useful purpose of two-way communication.

Training Programmes

The Committee have been informed that two *ad hoc* committees have recently been formed in the Defence R&D Organisation in Rocketry and Missiles and Radar Technology. These committees will draw up training programmes for scientists in these fields on national basis taking into account all the available resources in the country and having regard to the Defence requirements. The committees will also consider the quantum of assistance required by various institutes including the Indian Institutes of Technology in developing training facilities for Defence scientists in these two fields.

The Scientific Adviser has stated in evidence that there was a certain amount of lack of coordination earlier but since 1963 the Organisation has been making a conscious effort to bring about co-ordination. The Heads of the three organisations, *viz.* Atomic Energy, Defence Science and Council of Scientific and Industrial Research are now meeting at the highest level and coordinating.

The Committee commend the steps taken by the Defence R. & D. Organisation to maintain liaison with Indian Institutes of Technology and Universities. The Committee hope that energetic steps will be taken to enlarge the scope of collaboration with learned bodies like Indian Association for Cultivation of Science, National Institute of Sciences of India, etc.

C. Grants-in-aid Scheme

75. In pursuance of the general policy of associating civil scientists with Defence Research and Development efforts and for making use of the talents and facilities available at the Universities and Institutes, the Defence Research and Development Organisation has been offering financial assistance in the form of Grants-in-aid for undertaking research and development work on specific defence problems of non-classified nature. So far, 50 schemes have been assigned to universities, Indian Institute of Technology and other research Institutions. A list of projects allotted to them is given in Appendix XXII. A copy of Government letter No. 1329/DSO/7708/CG(Admn.) dated the 4th September, 1959 on Grants-in-aid Scheme is attached as Appendix XXIII.

The Ministry has stated that in the first six months of the current year about Rs. 4 lakhs have been given to the Universities/Institutes of Technology as Grants-in-aid on account of new projects and renewals. While farming out these projects and while these are in progress, Defence scientists visit the Universities/Institutes concerned to discuss the plan and progress of work. The Scientists

who are allotted these projects also visit the concerned R&D Establishments/Laboratories for discussion whenever considered necessary.

The Ministry has further stated that there is no Defence R&D Advisory Committee for approving projects under Grants-in-aid Scheme nor projects required to be farmed out to Universities and National Laboratories, etc. are to be approved by R&D Panels.

Research and Development proposals received from Universities and Institutions for support under Grants-in-aid Schemes are circulated to Directorates/Establishments/Laboratories of the R&D Organisation concerned for comments. If considered necessary, these are also considered in a meeting of representatives of Technical Directors at the Headquarters. After a proposal is accepted in principle, the programme of work is finalised by correspondence and/or personal discussions between the investigators and the R&D scientists concerned. The proposal is thereafter put up for sanction. Projects/proposals costing more than Rs. 30,000 are approved by the Executive Committee of R&D Organisation.

The Scientific Adviser has stated during evidence that "the grants-in-aid is given to the institution, not to the particular scholar. The money is passed through the Registrar. But the investigator who is in charge of the scheme is named. It is given in his name, though it is not put into his hands. Whether he is a Professor or an Officer, he is named there." He has further admitted that the initiative comes from the research scholar.

The Committee wanted to know whether any grant-in-aid was being given to the Sibpur Engineer College. The representative of the Ministry stated in evidence that "We are not giving any project to Government organisations. The Bengal Engineering College at Sibpur belongs to that category of Government organisation and therefore no project has been given to the Bengal Engineering College."

It has been stated that according to the Ministry of Finance (Department of Economic Affairs) O.M. No. F.8(22)-BA/65 dated the 18th September, 1965 (Appendix XXIV) to all Ministries/Departments, it is not permissible to give a grant to an organisation set up by a Government Resolution or Executive Order.

The Committee note the arrangements for giving grant-in-aid to the Universities for undertaking research on problems of interest to defence. From the list of projects sanctioned to universities/research Institutes upto October, 1966, the Committee find that no project has been assigned to Bengal Engineering College, Sibpur which is one

of the oldest technical institutions in this country. While the Committee appreciate that as per the Government of India Order grant-in-aid can be given only to a person or body which is independent of the Government, they see no reason why an institution should not be approached for undertaking research on specific defence problems without any grants-in-aid. The Committee feel that the Defence R. & D. Organisation should make a special effort to get the Government Engineering institutions and similar other institutions which have necessary facilities interested in defence research.

Review of Grants-in-Aid Schemes

76. In a written note supplied to the Committee, the Ministry of Defence has stated that in initial stages not many problems could be farmed out to Universities under Grants-in-aid Scheme. The reasons are:

- (a) It took time to formulate a suitable list of problems in various fields of defence science;
- (b) facilities at the Universities had to be explored; and
- (c) detailed programme of work on various projects referred to the various universities and institutes had to be worked out in consultation with investigators and concerned R & D Scientists.

But once the initial spade work was done, the scheme made satisfactory progress as would be seen from the expenditure incurred during 1963-64 to 1965-66:

1963-64	1964-65	1965-66
5.55 lakhs	2.38 lakhs	5.87 lakhs

When the Committee enquired whether on behalf of the Defence R & D Organisation any assessment as to the capacity of the Universities to undertake defence research work has been made, the Scientific Adviser has stated as follows:

“If you are having in mind any formal assessment and a sort of committee and finding, that has not been done. But if you have in mind whether we in Defence do this, the answer is yes. But there is no formal assessment. We have not made any formal enquiry, but we are certainly aware of it.”

He has also stated that “the grants-in-aid schemes have been worked now more or less for three years. We have gained experience. I would not say that the schemes are perfect. There are certain difficulties which have been noticed. We are trying to

simplify the rules. We will take a decision to make it better than what it is."

As regards the review being conducted by the Defence R & D Organisation of the tasks farmed out to universities, the Scientific Adviser has stated that half yearly progress reports are called for and these reports are referred to Establishments in the related subjects of defence for remarks. The Establishments concerned suggest sometimes that the project may be directed in a particular way or it may be closed or altered.

While the Committee note the efforts made by the Defence Research and Development Organisation in utilising the facilities for research existing in the universities, they feel that it is necessary to conduct a review of the working of the grants-in-aid scheme which has been in operation for over four years. The Committee suggest that the views of the universities receiving the grants may be obtained and thereafter the procedures and the policies of the entire scheme may be reviewed by a study team in which university people may be associated.

CHAPTER X

INFORMATION SERVICES

Media for dissemination of information

77. The information concerning defence R&D is disseminated through the following media:—

- (a) Through regular R&D publications as well as *ad hoc* publications and reports issued from time to time providing information on various aspects of organisation and activities of the Defence R&D in India.
- (b) Through exhibitions.
- (c) Through seminars, symposia and conferences.
- (d) Through documentary films (one such film entitled 'Arsenal for Defence' was made in 1964).

Besides numerous technical reports relating to specific projects and subjects, the R&D Organisation at present brings out the following five regular periodical publications, of which (c) and (d) are classified:

- (a) Defence Science Journal (Quarterly).
- (b) Research and Development Digest (Bi-monthly).
- (c) Research and Development Abstracts (Bi-annual).
- (d) Research and Development Bulletin (Annual).
- (e) Popular Science and Technology (Quarterly).

Publications like R&D Abstracts, R&D Bulletin and R&D Digest are primarily brought out for dissemination of information concerning R&D effort to the Services. Out of these, R&D Digest is distributed to the unit level in the services. Besides, the Scientific Advisers at Command Headquarters, keep in touch with the various units in the respective Commands by constant visits and thus to an extent keep the units informed of the current R&D effort.

A statement showing the number of copies printed, supplied free of cost and sold, sale proceeds, cost of printing and price of various journals brought out by the Defence R&D Organisation is given in Appendix XXV. It has been stated that in the earlier stages most

of the journals were supplied free to all the University Libraries with a view to acquaint them with the type of work carried out by the Defence R&D Organisation. In 1965 intimations were sent to all concerned giving full information of various publications, their frequencies, date by which contributions have to reach to the Editor and the date of issue of printed copies. The response has been good from a number of major Universities which are subscribing to the Defence Science Journal, Popular Science and Technology which are priced publications.

It has been represented to the Committee that the R&D Digest give more information about what is happening in the field of research and development in foreign countries than such information about India. The representative of the R&D Organisation has stated that the proportion of material at present between foreign and Indian is roughly 60:40.

The Scientific Adviser has stated during evidence that standard methods are applied to run the scientific journals brought out by the Defence R&D Organisation. It has an editorial Board for the scientific journals consisting of the Director General, Defence R&D Organisation, Prof. Sheshadri of Delhi University, Dr. Bhatnagar of Indian Institute of Sciences, Bangalore. Representatives of various disciplines, e.g., Mathematics, Physics, etc. are also associated with the journals. On submission of a paper, it is referred to someone who is an authority in the particular field.

The Committee are glad to note that Universities are showing increasing interest in the journals brought out by Defence R. & D. Organisation. They however suggest that not only Universities but also Engineering Colleges and all the important Institutes of Technology in the country should be encouraged to subscribe to these journals with a view to popularise the periodicals among science students so that they know something about defence science and get interested in it. The Committee urge that it should be the endeavour of the R. & D. Organisation to raise the standard of the contents of their publications so as to merit international recognition. They would also suggest that the information contained in the publications should relate more to what is happening in their own research laboratories than to what is happening outside.

Symposia and Seminars

78. Symposia/Seminars are organised to exchange ideas on topics of current interest, for pooling knowledge and to formulate broad lines of future action in the concerned fields and have been found to be useful in bringing out areas where efforts have to be further intensified.

A total number of 19 Symposia/Seminars were organised under the auspices of the Defence R&D Organisation during the Third Plan period, i.e., April 1962 to March 1967.

A list of Symposia/Seminars organised by the various Defence Research and Development Establishments/Laboratories during 1965-66 and those scheduled to be held during 1966-67 is given at Appendix XXVI. Besides the Symposia/Seminars listed, the R&D Establishments/Laboratories also organise internal Symposia on Scientific topics of interest to the Laboratory concerned.

A sum of Rs. 78,060 was sanctioned under the powers vested in the Scientific Adviser to various R&D Laboratories/Establishments, to meet the expenditure incurred on these Symposia/Seminars.

The Committee consider that holding of only 19 Symposia/Seminars during a period of five years indicates that the medium is not being utilised adequately. The Committee suggest that the symposia on practical problems being dealt with by the Defence R. & D. Organisation should be organised more frequently and with greater participation of scientists and technologists from outside the Organisation so as to let in the fresh air. The Committee also suggest that summer schools should be held for giving training to the apprentices and trainees at the various training institutes under the Organisation, and for providing opportunities to bring them in contact with senior scientists.

The Committee realise that participation in exhibitions does obviously affect the normal R. & D. work, yet it has to be viewed against the gain from the angle of opportunities that these exhibitions provide for a wider dissemination of information concerning defence effort (including R. & D.).

Annual R&D Conferences

79. The Annual R&D Conference of the Directors of Establishments and the Principal Officers from R&D Headquarters, has been held every year since the formation of the Organisation in 1958, the object broadly being to take stock of what has hitherto been done, give a thought to the broad lines of future policies and programmes and discuss measures needed to tackle various problems, organisational and others, in furtherance of the objectives. The authority for holding the conference is contained in the Government of India letter No. 86020/RD/Tech. Coord/1013/CG(Admin), dated 7th February 1962, which superseded an earlier letter.

The first four Conferences were held at R&D Headquarters, Delhi from 1958 to 1961 in about April-May each year. The subsequent

Conferences, i.e., 5th, 6th, 7th and 8th were held, again in April-May each year, respectively at Bangalore (1962), Kirkee (1963), Hyderabad (1964) and Bangalore (1965). The different venues were in accordance with a decision to hold Annual Conferences at one of the major R&D Centres in rotation rather than always at Delhi. Besides usual participants the Conference is attended by the Secretary/Joint Secretary of the Ministry of Defence (Department of Defence Production).

The Annual R&D Conference during 1966—the 9th in the series—was held at the Institute of Armament Technology, Kirkee (Poona) from 10th to 13th April, 1966.

The Committee are given to understand that regular follow up action is taken on the recommendations made at the annual conferences. Before each conference, a brief report of the action taken on the recommendations/decisions of the previous conference is circulated. The following are a few examples of the important policy matters that were formulated as a result of discussions at the annual conferences:

- (a) Progressive decentralisation of administrative and financial powers to Heads of R&D Establishments/Laboratories.
- (b) Drawing of a new apprenticeship training scheme in place of the Defence Research Fellowship scheme to meet the shortage of trained manpower for R&D Organisation.
- (c) Review of procedure for submission of budget proposals.
- (d) Preparation of an appropriately phased out five year R&D plan commencing from 1964-65 to build up manpower and material resources.
- (e) A uniform procedure for placing of development contracts.

The Committee desired to be furnished with a copy each of the proceedings/minutes of the Conferences held since 1962 and those have been supplied by the Ministry. *Inter alia* the agenda covered at the 9th Conference was as follows:—

- (i) A critical review of the build up pattern of the Defence R&D hitherto and future lines of action.
- (ii) A brief review of progress on recommendations/decisions of the last annual conference.
- (iii) A report by Director of Administration on some of the important administrative matters.

- (iv) Discussion on certain specific issues of day-to-day policy and procedure.
- (v) Presentation of reports of various Groups of Organisation by Headquarters Directors as well as reports by Scientific Advisers to Services Headquarters and to Commands.

The Committee note that the R. & D. Conference is an annual feature of the Defence Research and Development Organisation. This enables the Principal Staff Officers, Directors of Field Units and Technical Directors at the Headquarters to take a co-ordinated look once a year at the Defence R. & D. efforts as a whole to assess how well the Organisation is fulfilling its charter of duties and to discuss measures needed to tackle various organisational and other problems to further the objectives. The Conference provides an occasion for self-introspection. The Committee are glad to note that the discussions held in these conferences are not only free and frank but very useful and stimulating and are bound to lead to fruitful results. The Committee commend the businesslike manner in which the proceedings are conducted at these Conferences and hope that the organisation will continue to benefit from such Conferences.

CHAPTER XI

TRAINING FACILITIES

A. Facilities available

80. A leading scientific organisation has represented to the Committee that although the facilities in the country for training in various fields of defence science and technology are adequate, arrangements must be made to have it defence-oriented to suit the defence needs.

A suggestion has also been made that a scheme may be formulated for deputing defence technical personnel to undergo advanced post-graduate training at the Indian Institutes of Technology and Indian Institute of Science, Bangalore and other post-graduate training centres and some universities.

During the course of evidence, the Committee wanted to know whether any comprehensive survey has been made of the facilities available in the various institutes in the country for advanced training in fields of defence interest. The Scientific Adviser has stated in reply as under:

"I won't say that a very comprehensive survey has been made, but we are generally familiar with the facilities available at the various institutes of technology and higher places of learning. Regarding the courses that will be of use to Defence Scientists, for example, there are courses run by the National Physical Laboratory, the Atomic Energy Commission, the Central Electro-Chemical Institute, the Indian Institute of Technology, Kanpur, the Indian Institute of Science, Bangalore, the Institute of Communicable Diseases, Delhi, and the Indian Institute of Technology, Kharagpur."

During the evidence, the Deputy Chief Scientist has stated that although the courses are not entirely defence-oriented, they are certainly useful for defence technology. For example, the Institute of Petroleum Technology runs a good post-graduate course in Petroleum Technology and the Defence Research and Development Organisation takes advantage of it by sending R&D Scientists there. He has also stated that the R&D Organisation is examining the question of hav-

ing a special course for Defence people at the Institute of Technology at Kanpur. The Scientific Adviser has further informed the Committee that action has been initiated in trying to get some of the institutes to run courses which will be specially useful for defence scientists. There are two committees which are looking into the question of running such courses.

The Committee have noted the efforts made by the Defence R. & D. Organisation in locating as well as arranging facilities for training of defence scientists. They, however, consider that there is still much scope as well as urgent need for further exploration of training facilities in special important fields like radar, electronics, guided missiles, etc., and they would like to stress the need for taking proper steps in this regard as speedily as possible.

B. The Institute of Armament Technology, Poona

81. The need for imparting higher education to Defence Service Officers in Science and technology has been recognised by the Government of India. In 1949 the services of General Patterson of the British War Office were obtained to advise the Government on the problems relating to the setting up of an establishment for this purpose. His recommendations were accepted in principle by the Government and the Institute of Armament Studies was set up in 1952 with the approval of both the Standing Finance Committee and the Planning Commission with the object of imparting training to the Technical Officers of the three Services and to the scientists under the Scientific Adviser, knowledge of Weapons Technology (i.e., design, evaluation, inspection, etc.) and also to conduct research in that direction.

In order to expedite its functioning the Institute was, as an interim measure, located within the campus of the College of Military Engineering, Kirkee where certain existing facilities could be made use of.

In 1961, the Government constituted an Advisory Board for the Institute of Armament Technology to ensure proper development and functioning of the Institute.

The original emphasis at Institute of Armament Technology was mainly on conventional armaments. This has now been extended to other fields of specialisation like vehicles, guided missiles, etc. also.

In view of the considerable increase in the activities of the Institute in various fields of science and technology, the Institute has been

redesignated as the "Institute of Armament Technology" and its charter of duties also has been revised as detailed below:—

- (a) To train officers of the Defence Services and Defence civilian scientists in various fields of science and technology of armaments which have a direct bearing on the requirements of Defence. The Institute would be responsible for conducting courses on basic science and technology and in advanced fields of specialisation as approved by the Government from time to time.
- (b) To encourage by research and other means, technological developments applicable to or of interest to defence.
- (c) To promote and disseminate knowledge of Defence Science and Technology; and
- (d) To maintain contact with universities and other scientific institutions in the country and abroad.

In order to be able to fulfil the primary function of teaching at post-graduate levels, the staff of the Institute undertakes investigations of, research into, and development of a number of problems that have a bearing on matters of Defence. A Research Panel consisting of the senior staff of the Institute supervises this important aspect of the Institute's work.

The projects handled at the Institute have been divided into basic research, applied research, development, special study or fabrication of training aids. The Scientific Adviser has clarified during evidence that basic research is actually being done at the Laboratories. The Institute of Armament Technology comes in, in a certain way, to do research because no training or teaching establishment can keep itself abreast unless it does a certain amount of research.

Higher Direction and Control

82. Important matters of policy are normally referred either to the Inter-Services Equipment Policy Committee or to the Chiefs of Staff Committee. The recommendations of these are considered wherever appropriate by the Defence Research and Development Council, under the Chairmanship of the Defence Minister.

In addition, the Advisory Board advises the Ministry of Defence on matters of policy concerned with the Institute as the centre of higher technical education for the Army, Navy and Air Force, and

for scientific and technological research in Service equipment. At present the Board is constituted as follows:—

CHAIRMAN—Dr. S. Bhagavantam, Scientific Adviser.

MEMBERS—Vice Chancellor, University of Poona.

Director, Indian Institute of Technology, Bombay.

Director, Indian Institute of Technology, Kanpur.

Director of Military Training, Army HQ.

Chief of Material, Naval HQ.

Director of Training, Air HQ.

Director General of Inspection, Ministry of Defence,
New Delhi.

Chief Controller, Research and Development.

Deputy Chief Scientist, Research and Development
Organisation.

Dean, I.A.T.

The Committee have noted that there is no representative from the CSIR on the Advisory Board which advises the Ministry of Defence on matters concerned with the Institute of Armament Technology. The Committee would urge that in the interest of better coordination, CSIR should also be represented on this Board.

Courses

83. The authorised courses of instruction to be conducted at the Institute of Armament Technology, *vide* Government of India letter No. 89358/RD/Tech/Coord/6868/A/D (R&D), dated the 6th August, 1964, together with the maximum duration, normal course strength, maximum frequency of intake and maximum period of instructional tour is given in Appendix XXVII.

In a written note furnished to the Committee, it has been stated by Institute of Armament Technology that the training imparted at the Institute in selected fields of armament technology is at present unobtainable elsewhere in the country. This training is unique and armament-oriented for effective work towards self-reliance and self-sufficiency in armaments. Till September, 1966 the Institute has trained 817 officers out of which 260 have completed long courses with effective capabilities for working on design, development, production and inspection of armaments and associated equipments. Officers completing long courses are posted to units/establishments concerned with indigenous design, development, production, inspection and maintenance tasks as per their requirements.

The mode of selection of personnel is not the same in all courses; it varies from course to course and from service to service. In certain

cases competitive examinations are held followed by interviews: in others only interviews are held. Yet in other cases, vacancies are filled by nomination.

These methods have been evolved over a period of time to suit the requirements of the Services. The methods are not sacrosanct and are modified also from time to time as necessary.

The eligibility conditions for the various courses at the Institute are given at Appendix XXVIII.

The Committee have been informed that no officer was sent on training during 1964 and 1965 in the following courses:

- (i) Advanced Electronics Course
- (ii) Basic Science and Technology Course for Naval Officers
- (iii) Advanced Technological Course for Naval Officers.

In a written note furnished to the Committee it has been stated that the running of Advanced Electronics Course was discontinued since the emergency in 1962 in view of the indicated requirements of the Services being too meagre to warrant a full-fledged course. As provision has been made to include specialisation in electronics as one of the options in the second part of Technical Staff Officers' Course, the question whether a separate Advanced Electronics Course would be necessary or not is under consideration of the Headquarters. No course of shorter duration has replaced this course.

The Committee have also been informed that the review of the courses is under consideration at present. Some of the proposals to be discussed at the Advisory Board meeting are given below:

- (i) Institution of Advanced Technology Course at Post-Graduate level (in Radar Technology, Armaments and Vehicles).
- (ii) Special Weapons Course.
- (iii) Revision of TSOs' Course to meet the requirements of Defence Inspection Organisation.

During the review the question of availability of sufficient number of students from the Services and Defence Science will be kept in view.

A statement showing categories of training courses conducted during 1966 including total strength in each Course is given in Appendix XXIX.

The Committee are unhappy to note that it has not always been possible for the Services to spare officers with the consequence that the courses had to be made of a shorter duration. The Committee are of the view that shortening of a course would only result in reducing the competence of the trainees and would vitally affect the interests of the defence science and technology. The Committee would like to urge that the question of duration of the courses should be reviewed as early as possible. They would also urge that when a particular course is started it should be ensured that the intake capacity is fully utilised.

C. The Institute of Work Study

84. The level of efficiency of any organisation depends on the extent to which optimum use can be made of the resources available with the organisation. Resources are essentially of two kinds, material and human. For the optimum employment of all available resources to the best advantage of any organisation, education and training at all levels of management are essential.

It was with this view of improving the working efficiency of the Defence Services that the Institute of Work Study was set up at Landour (Mussoorie). The Institute started functioning from July, 1962, with the following charter of duties:

- (a) to train personnel of the Defence Services and organisations in Work Study and allied managerial subjects;
- (b) to offer, on request, assistance to any Service Branch or Directorate in the field of practical application of Work Study.

The Ministry has informed the Committee in a written note that the Institute of Work Study, functioning primarily as a training establishment, is training sufficient number of officers to undertake practical jobs in the works study cells in their respective organisations.

The Work Study teams in the services have carried out useful work study projects which have resulted in laying down better procedures thereby increasing efficiency and reducing wasteful man-hours.

With the limited staff the Institute has also conducted guided pro-

jects by the students for various services and inter service organisations on the following aspects:

- (i) Administrative procedure;
- (ii) Lay-out of offices (NPC);
- (iii) Provision and supply of clothing to NCC Wing;
- (iv) Maintenance of Naval Officers' personal records;
- (v) Azo-printing methods—E-in-C's Branch;
- (vi) Procedures for purchase of equipment involving foreign exchange in R & D Organisation; and
- (vii) Work Study on fitting and machine shop—office Mazagaon Dock Ltd., Bombay.

The recommendations made in the project reports have been accepted by the services.

The Institute hopes to carry out functions of consultancy and research for which additional staff has been asked for.

The courses conducted by the Institute are as under:

- (i) Advanced Work Study Course.
- (ii) Basic Work Study Course/Method Study Course (Revised name of Basic Work Study Course)/Recorder Analyst Course (Revised name of Method Study Course)/Work Study Assistants Course (Revised name of Record Analyst Course).
- (iii) Work Study Appreciation Course.
- (iv) Work Study Appreciation Conference.
- (v) Production Planning and Control Course.

A statement showing the duration of courses, capacity, number of courses conducted and the number of officers trained during the period 1962—1965 is given in Appendix XXX.

The Committee note with concern that the number of courses conducted by the Institute of Work Study have varied from year to year. Even the intake capacity for the various courses has not been fully utilised. The Committee cannot too strongly stress the need for fuller utilisation of the existing capacity and would suggest that the Ministry may investigate the reasons for shortfall and take remedial action.

..

Selection of officers for training

85. It has been represented to the Committee that "Officers are sent on training without the application of any selection standards; but, what is worse is that officers who have received training in Work Study are not used in the field of work study. In the first 2½ years of the inception of the Institute, not even 10 per cent. of its graduates were employed in Work Study on their return to their units."

The Scientific Adviser admitting that the officers who have been trained in Work Study are not employed later on these jobs but are given some other work, explained the position as follows:—

"In the present situation, we cannot afford to have all officers attending to work study; we pick the people who have an aptitude for that and they do other work also. They are expected to help the officers on top management viz., the Director in undertaking works study methods. It is true that those who are in the Works Study are not put in their own Institutes."

The Committee feel that since work study has been accepted as an integral part of defence science, efforts should be made to fully exploit it on proper lines. They would like to recommend that persons who have been trained in work study, should be engaged on similar work wherever they are posted with a view to derive maximum advantage from their training.

D. Fire Service Research, Development and Training Establishment, Delhi Cantt.

86. The Fire Service Research, Development and Training Establishment was previously a Headquarters formation, known as the Fire Fighting Training Centre, with the Fire Adviser to the Ministry of Defence as its Commandant. During the year 1962 it was brought under the purview of the R & D Organisation as one of its constituent units.

The aims and objects of the Establishment are:

- (1) Training of the Defence Personnel and Officers in fire prevention, fire extinction, rescue and salvage measures.
- (2) Research and study of fire extinguishing media, conducting evaluation trials of new fire fighting equipments with a view to assess their usefulness for Defence Fire Services.
- (3) Development of fire fighting appliances and gears, etc. from indigenous sources.

- (4) Research and study activities in respect of fire prevention, fire statistics, new methods of extinction and automatic and fixed fire fighting equipment, etc.
- (5) Investigation into the causes of fire incidents with a view to minimise fire hazards.

Asked to state the number of courses conducted by the Fire Service Research Development and Training Establishment for Officers in General Fire Prevention and Fire Fighting during 1963, 1964 and 1965, the Ministry has in a written note stated that courses for officers were planned to be conducted in the later part of 1962. Due to inability of the Services to spare their officers due to emergency, no courses were conducted in 1963 and 1964. Two officers courses were however run in 1965. Other types of courses, 7 in 1963, 8 in 1964 and 9 in 1965 were conducted for non-gazetted officers. The intake for the two courses conducted in 1965 was 14 and 15, respectively.

When the Committee desired to know whether the capacity at the Establishment is being fully utilised, the Deputy Chief Scientist stated during evidence as under:

“At the moment we get a few requests from the Ministry of Home Affairs, but as it is, the Fire Services Establishment is finding it difficult even to cope with the present requests from our own Services or our own organisation in the Defence Ministry and to some extent from the Ministry of Home Affairs. With the present staff, I doubt whether we can take trainees from other establishments.”

The Committee regret to note that since its inception in late 1962, no training courses were conducted at the Fire Service Research, Development and Training Establishment for officers till 1965 mainly because of the inability of the Services to spare their officers. They hope that in future better use of the training facilities existing at the Establishment will be made by the Services. It is regrettable that Services failed to take advantage of the facilities of training during 1962—1965.

Liaison with C.S.I.R.

87. The Committee understand that a proposal for setting up a Fire Research Station under the Central Building Research Institute, Roorkee, was considered by the Planning Commission and a provision of Rs. 20 lakhs was made for setting up the Station during the Third Five Year Plan period. However, for want of finance,

the project could not be taken up. The question came up for consideration of the Executive Council of the Central Building Research Institute, Roorkee, at its meeting held in August, 1965. The Executive Council recommended that, in case the C.S.I.R. did not find it possible to finance the entire scheme, the work relating to the fire testing of the building material should be taken up by the C.B.R.I. as a separate major research project and the rest of the work relating to the testing of fire equipment may be referred back to the Ministry of Home Affairs and the Indian Standards Institution who had initiated the proposal. The recommendation of the Executive Council of the Central Building Research Institute, Roorkee, for setting up the Fire Research Division at the Institute instead of Fire Research Station was considered by the Board of Scientific and Industrial Research and the Governing Body of the C.S.I.R. in their meetings held on April 14—16, 1966. The Committee of the C.S.I.R. recommended that the Division when set up should establish close coordination with the Fire Service Research and Development Establishment of the Ministry of Defence, Delhi. The recommendation of this Committee was endorsed by the Board of Scientific and Industrial Research and the Governing Body of the C.S.I.R.

The Estimates Committee understand that the Fire Research Division will ultimately have the following responsibilities:

- (i) To study initiation, outbreak, growth, suppression of fire and behaviour of materials in fire.
- (ii) To undertake research on fire resistance of elements of structures, including rates of combustion and flamability.
- (iii) To study special fire hazards.
- (iv) To undertake test of elements of structures and fire appliances.
- (v) To carry out research on prevention and extinction of fires.

This Division will also act as an agency for the collection and dissemination of all the information relating to Fire Research and establish close liaison with the various Central and State agencies concerned and the Fire Research Organisations abroad.

The Committee are not happy that a separate Fire Research Division is being set up under the C.S.I.R. when there is already a well-established Research Organisation under the Ministry of Defence—Defence Research and Development Organisation. The Committee hope that the Fire Research Division of the Central

Building Research Institute, Roorkee, will not take up such of the activities as are being performed by the Fire Service Research, Development and Training Establishment under the D.R. & D.O. The Committee would like to stress the need for maintaining a close liaison between the two organisations. They also suggest that the scope of augmenting the training facilities at the Fire Service Research Development and Training Establishment may be explored so that personnel from Civil Research Institutes as also the Ministry of Home Affairs, academic institutions etc., also could be trained there in fire fighting operations.

E. Fellowship/Apprenticeship Scheme

88. To meet the shortage of trained scientists for manning the Defence R&D Establishments/Laboratories a Fellowship Scheme was instituted in 1959 with the approval of the Defence Committee of the Cabinet and provision was made for an annual intake of 50 fellows for 5 years. Under this scheme, batches of scientists, normally below the age of 30 years, were selected and awarded junior/senior fellowships, of the value of Rs. 250 and Rs. 400 respectively, according to their qualifications. The fellows were put through a period of training aimed at re-orientation to defence science and then absorbed in the Defence Science Service through the UPSC. In all 166 fellows were trained under this scheme. In the light of experience gained over the past five years, the fellowship scheme has been replaced by a modified scheme in November 1963, viz., the Apprenticeship Training Scheme, which provides for training of 150 senior (officers) apprentices in the first two years and 100 in subsequent years in specific fields of defence science and technology.

Under the scheme the following three schools have started functioning:

- (a) Electronics School to cover requirements of electrical, radio, radar and tele-communication engineering at the Institute of Armament Technology, Kirkee.
- (b) Armament School to cover the requirements of explosives, armament technology, metallurgy, instrumentation, mechanical and chemical engineering, etc. at the Institute of Armament Technology, Kirkee.
- (c) Basic Science School to cover the basic sciences like mathematics, ballistics, physics and chemistry and special subjects, such as radiation medicine, military psychology, physiology and aeronautics at the Defence Science Laboratory, Delhi.

Stipends for Apprenticeship for senior scale are Rs. 300 per month and that for junior scale Rs. 150 per month. The apprentices are not entitled to any allowances.

It has been stated that the Apprenticeship is open to Indians of both sexes between the ages 21—27 years for senior and 19—25 years for junior categories, possessing the following qualifications:—

(i) For Junior Apprenticeship

A first class degree in Science or diploma in Engineering/Metallurgy/Instrument Technology pertaining to the subject of the apprenticeship applied for.

(ii) For Senior Apprenticeship

A good second class Master's degree in Science or Bachelor's degree in Engineering/Metallurgy/Instrument Technology etc. pertaining to the subject of the apprenticeship (holder of Ph.D./D.Sc., will be given preference). In the case of physiology candidates should be holders of M.B.B.S. degree.

Under the scheme two courses each of one year duration have been instituted. The intake capacity and the number of persons recruited under the scheme are as follows:—

	Intake capacity		No. recruited	
	Senior	Junior	Senior	Junior
Ist Course	150	50	67	16
2nd Course	150	100	90	59

Details regarding completion of training and absorption of the trainees are given below:

First Course

Senior—63 (17 were absorbed as SSOs II and 46 as JSOs)

Junior—11 (All were absorbed as JSAs Grade I)

Second Course

Senior—Senior Apprentices have only completed first phase training of six/seven months. Now undergoing second phase of their training in various R&D Establishments/Laboratories.

Junior—46 (30 were absorbed as JSAs Grade I, 5 as Charge-men Grade II and 11 as Supervisors Grade II).

As to the quality of the trainees the Committee have been informed that as 17 Senior and 11 Junior Apprentices of the 1st batch and 30 Junior Apprentices of the second batch were adjudged suitable, on completion of their one year training, for appointment as SSOs II and JSAs I respectively, it implies that the quality of trainees was fairly good. It has, however, been added that the trainees have benefited considerably as they were provided specialised training in the Establishments where they were to be absorbed finally so as to prove useful from the very first day of their appointment as scientists.

It has been stated that during the training of one year, assessment of apprentices will be carried out continuously. A Confidential Card will be maintained for each apprentice wherein progress being made by him in various aspects will be systematically shown. Students who do not make satisfactory progress will be "weeded out" in the earlier stage of the training. Those who complete the training successfully and obtain 60 per cent or above marks will be appointed as SSO II and others as JSOs, with the approval of U.P.S.C.

The Ministry has informed the Committee that the apprenticeship of 1 Senior Apprentice of the first batch of the Basic Sciences School was terminated due to his poor performance in the first phase training. Similarly, 11 Junior Apprentices of the second batch were weeded out during the first 3 months of the training.

Asked about the large number of vacancies of Senior Apprentices allocated in the first course under the Apprenticeship Training Scheme, the Ministry of Defence has, in a written note, stated as under:

"The U.P.S.C. after scrutinising 1960 applications had selected as many as 917 candidates for interviews. However, out of those selected, only 410 appeared for interview and 105 of them (49 in Basic Sciences, 27 in Armaments and 29 in Electronics) were recommended by the Commission for training and 67 candidates actually accepted the apprenticeship (33 in Basic Sciences, 18 in Armaments and 16 in Electronics)."

Asked to state the reason for poor intake of apprentices for the Junior and Senior Courses, the Scientific Adviser has stated in evidence that the poor intake is very much due to the poor scales of stipends offered to the apprentices. As to the pay scales offered to the apprentices under the C.S.I.R., the Ministry of Defence in a written note has stated as under:

"Junior Fellowship in the Council of Scientific and Industrial Research carries a value of Rs. 250 (Rs. 300 per month in the case of certain specialised subjects). Senior Research Fellowship, on the other hand, is of Rs. 400 p.m. (Rs. 500 p.m. in the case of certain specialised subjects). C.S.I.R. Research Fellowships are supposed to be granted to individuals for undertaking a particular project in a University or Institution. Such Fellows need not necessarily be absorbed in C.S.I.R. Laboratories whereas the value of the stipends for Senior/Junior Apprenticeships in the R & D Organisation is Rs. 300/- 150 p.m., respectively and they are invariably absorbed in R & D Organisation after successful completion of the training as an apprentice. Since the concept of Fellowship in the Organisation is different we do not think that the rate of stipend should be identical but the present rates should be increased."

As regards the facilities provided to the apprentices in the C.S.I.R. and the Defence R & D Organisation, the Scientific Adviser has stated as under:

"If you take the whole picture, it will be seen that they get little more freedom. They can work on subjects which are in their line. In other words, they can work for a Doctorate degree. There are certain facilities that way, in joining the C.S.I.R. If they join us in an apprenticeship scheme, we do not allow them to work on any subject in which they like to work. We take them, train them as officers and so, by and large, there is a preference for a C.S.I.R. fellowship if a young man can get that."

The Committee have been informed that the question of giving higher rate of stipends to the apprentices has been taken up with the appropriate authorities.

The Committee are unhappy that the Apprenticeship Training Scheme has not been able to attract suitable candidates in adequate numbers and that the intake capacity has remained under-utilised. The Committee feel that poor response is mainly due to unattractive stipends paid to the Apprentices. The Committee suggest that the question of raising the quantum of stipends for the Apprentices be considered by Government so that brilliant and talented research scholars are encouraged to look for their careers in the Defence Research and Development Organisation.

CHAPTER XII

EVALUATION OF R & D WORK

89. In their 95th Report on the Ministry of Defence—Defence Research and Development Organisation—Electronics and Radar Development Establishment, Bangalore and Defence Electronics Research Laboratory, Hyderabad, the Estimates Committee (Third Lok Sabha) stressed the need for a periodical evaluation of the research and development work of the various R & D Establishments every five years by a committee consisting of eminent scientists drawn both from the Defence Research and Development Organisation and from outside.

During the course of the evidence, both the Scientific Adviser and the Secretary, Defence Production, have admitted the need for a periodical review but they have suggested that it would be desirable to conduct such a review by the scientists of the Defence R & D Organisation itself because outside scientists could not have sufficient contact with or knowledge of Defence Research Laboratories. The Scientific Adviser, however, agreed that a "Reviewing body consisting of a sufficient number of people from within the organisation and who can represent the point of view of defence, which is not known sufficiently widely, might work."

The Committee would like to reiterate their earlier recommendation made in para 36 of their 95th Report (Third Lok Sabha) stressing the need for periodical evaluation of the research work conducted by the Research and Development laboratories/establishments once every 5 years by a committee consisting of eminent scientists drawn both from the Defence Research and Development Organisation as well as from outside. In view of the fast changing developments in the field of science, the Committee would urge that the first such quinquennial evaluation should be done immediately in addition to the usual evaluation made by the Organisation. In addition to the quinquennial review, the Committee would also stress the need for evaluating research at the institutional level in terms of achievements in relation to the objectives set forth and the resources utilised. Such an evaluation is necessary with a view to see whether the investments in terms of resources are commensurate with the possible gains from the results of research.

CHAPTER XIII

SECURITY CONSIDERATION IN DEFENCE RESEARCH

90. It has been represented to the Committee by an eminent scientist that "very often, we tend to hide under secrecy things which are known to the enemy, and they are kept as secret from our people." In this connection it would be worthwhile to quote from the Trend Committee Report into Organisation of Civil Science in U.K. "Considerations of security are often an inevitable impediment to the free communication of knowledge and discovery between the civil and military sectors of Government. Nevertheless, it is essential that such impediments should be reduced to the minimum and that industry in general should be enabled to derive the maximum benefit from the 'technological fall-out' of research, promoted originally for military purposes." The Scientific Adviser in this connection stated as follows:—

"There should be no secrecy at all in regard to basic researches that are done even to a small extent in the Defence Laboratories. There should be no secrecy at all even in applied research so far as the applications related to general development work. But I like to make a reservation regarding a small number of development projects which are clearly defined. Weapon system—on that there will have to be a certain amount of secrecy; otherwise much is made about this secrecy and we should get rid of it."

During the evidence it was suggested that industry in general should be enabled to derive maximum benefit from the technological fall out of the research promoted originally for military purposes. The Scientific Adviser stated that while he fully agreed with the spirit behind the suggestion and "we should work to it", he urged "we have not reached a stage where our technology is of that magnitude, on which we spend a lot of money for military purposes, and there is fall out so to say by which the industry can benefit."

The Committee feel that there is too much of stress on the secrecy aspect in Defence Science which is not necessary. The Committee recommend that the question of secrecy and classifica-

tion in defence scientific research should be examined from time to time with a view to keep it to the barest minimum.

NEW DELHI;

July 26, 1967

Sravana 4, 1889 (Saka)

P. VENKATASUBBIAH,

Chairman,

Estimates Committee.

APPENDIX I

(Vide Para 1)

SCIENTIFIC POLICY RESOLUTION

New Delhi, the 4th March 1958/13th Phalguna, 1879

No. 131/CF/57.—The key to national prosperity, apart from the spirit of the people, lies, in the modern age, in the effective combination of three factors, technology, raw materials and capital, of which the first is perhaps the most important, since the creation and adoption of new scientific techniques can, in fact, make up for a deficiency in natural resources, and reduce the demands on capital. But technology can only grow out of the study of science and its applications.

2. The dominating feature of the contemporary world is the intense cultivation of science on a large scale, and its application to meet a country's requirements. It is this, which, for the first time in man's history, has given to the common man in countries advanced in science, a standard of living and social and cultural amenities, which were once confined to a very small privileged minority of the population. Science has led to the growth and diffusion of culture to an extent never possible before. It has not only radically altered man's material environment but, what is of still deeper significance, it has provided new tools of thought and has extended man's mental horizon. It has thus influenced even the basic values of life, and given to civilization a new vitality and a new dynamism.

3. It is only through the scientific approach and method and the use of scientific knowledge that reasonable material and cultural amenities and services can be provided for every member of the community, and it is out of a recognition of this possibility that the idea of a welfare state has grown. It is characteristic of the present world that the progress towards the practical realisation of a Welfare State differs widely from country to country in direct relation to the extent of industrialisation and the effort and resources applied in the pursuit of science.

4. The wealth and prosperity of a nation depend on the effective utilisation of its human and material resources through industrialisation. The use of human material for industrialisation demands its education in science and training in technical skills. Industry opens up possibilities of greater fulfilment for the individual. India's enormous resources of manpower can only become an asset in the modern world when trained and educated.

5. Science and technology can make up for deficiencies in raw materials by providing substitutes, or, indeed, by providing skills which can be exported in return for raw materials. In industrialising a country, a heavy price has to be paid in importing science and technology in the form of plant and machinery, highly paid personnel and technical consultants. An early and large scale development of science and technology in the country could therefore greatly reduce the drain on capital during the early and critical stages of industrialisation.

6. Science has development at an ever-increasing pace since the beginning of the century, so that the gap between the advanced and backward countries has widened more and more. It is only by adopting the most vigorous measures and by putting forward our utmost effort into the development of science that we can bridge the gap. It is an inherent obligation of a great country like India, with the traditions of scholarship and original thinking and its great cultural heritage, to participate fully in the march of science, which is probably mankind's greatest enterprise today.

7. The Government of India have accordingly decided that the aims of their scientific policy will be:—

- (i) to foster, promote, and sustain, by all appropriate means, the cultivation of science, and scientific research in all its aspects—pure, applied, and educational;
- (ii) to ensure an adequate supply, within the country, of research scientists of the highest quality, and to recognise their work as an important component of the strength of the nation;
- (iii) to encourage, and initiate, with all possible speed, programmes for the training of scientific and technical personnel, on a scale adequate to fulfil the country's needs in science and education, agriculture and industry, and defence;
- (iv) to ensure that the creative talent of men and women is encouraged and finds full scope in scientific activity;
- (v) to encourage individual initiative for the acquisition and dissemination of knowledge, and for the discovery, of new knowledge, in an atmosphere of academic freedom; and
- (vi) in general, to secure for the people of the country all the benefits that can accrue from the acquisition and application of scientific knowledge.

The Government of India have decided to pursue and accomplish these aims by offering good conditions of service to scientists and according them an honoured position, by associating scientists with the formulation of policies, and by taking such other measures as may be deemed necessary from time to time.

APPENDIX II

(Vide para 5)

CONSTITUTION OF DEFENCE SCIENCE POLICY BOARD

COPY OF O.M. No. 555-M/COORD(A) DATED 22-1-1949.

Defence Science Policy Board—Constitution of

It has been decided to set up a Board called the Defence Science Policy Board with the following composition:

1. Secretary, Ministry of Defence—*Chairman*
2. Dr. S. S. Bhatnagar.
3. Dr. H. J. Bhabha.
4. Dr. K. S. Krishnan.
5. G. N. S. and C-in-C., Royal Indian Navy.
6. C.O.A.S. and C-in-C., Indian Army.
7. C.A.S. and C-in-C., Royal Indian Air Force.
8. Financial Adviser, Defence.
9. Joint Secretary, Ministry of Defence.
10. Scientific Adviser to the Ministry of Defence.

2. The Board may invite distinguished foreign scientists for consultations, and may, co-opt them as members of the Board during their visit.

3. The Board will advise the Defence Ministry on all aspects of Defence Science and problems of operational research. It will also give such advise, and his Scientific Advisory Committee. It will be the duty of the latter to refer to the Board all important problems under their consideration and to report progress generally.

Sd/- RAGHUNATH PERSHAD

Deputy Secretary to the Govt. of India.

To

Members of the Board.

Naval Headquarters.

Army Headquarters.

Air Headquarters.

All Officers of the Ministry of Defence (including Pension Branch).

APPENDIX III

(Vide para 7)

FUNCTIONS OF THE RESEARCH & DEVELOPMENT ORGANISATION

◀Appendix to Memo No. F.23(28)|58|CG(Admn.) dated 19-8-1959
28th Sravana, 1881

The Organisation will be responsible for research, design and development of equipment for the Services. The following activities will, therefore, come under its control:—

- (a) All Research, Design and Development required for weapons and equipment planned to be produced without imported "know-how". Such Research, Design and Development as may be asked for by Production Authorities in the case of items to be produced under licence|with imported "know-how".
- (b) Modification/to existing equipment relating to design or improvement.

Note:—Minor changes in design not affecting the essentials of the design may be permitted by the inspection authorities without prior approval of the R&D Organisation in currently manufactured stores. Such changes will, however, be intimated to the R&D Organisation immediately.

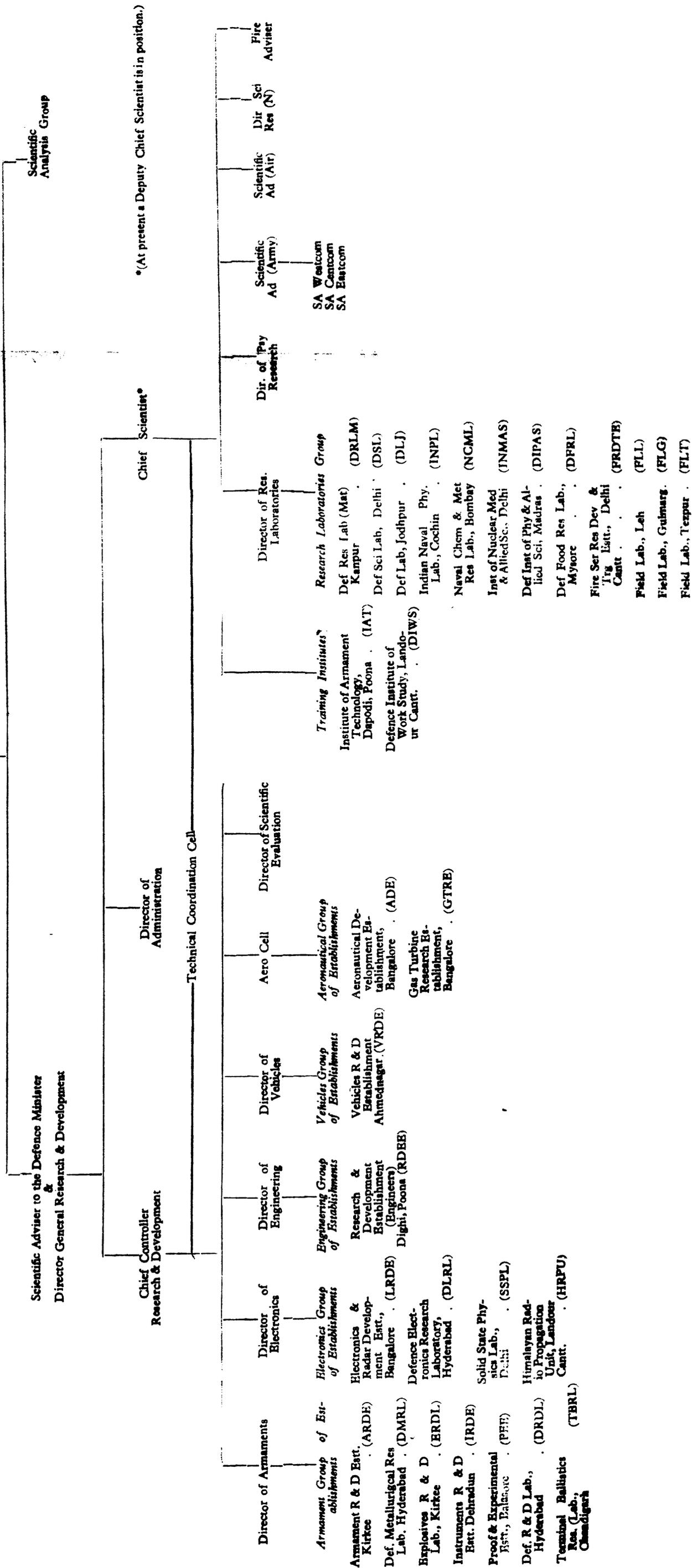
- (c) Investigations and experiments at all stages of development with a view to determining the causes of failures, if any, and suggesting remedial measures for production.
- (d) Carrying out technical trials when desired by the Service Headquarters concerned of all new weapons and equipment with a view to assessing their performance and recommending their technical suitability for introduction into the Service.
- (e) Preparation of specifications of new weapons and equipment based on Qualitative Requirements given by the Services. Preparation of all drawings in respect of all weapons and equipment developed indigenously. Preparation of such drawings as may be asked for by production authorities in cases of establishment of indigenous manufacture under licence.

(f) Technical guidance to civil trade for the manufacture of prototypes of equipment designs of which have not to date been sealed for service use.

2. On the scientific side, this Organisation will be responsible for the co-ordination of research in all experimental establishments, Universities and National Laboratories.

3. This Organisation will also be responsible for advising the Services staff on all scientific aspects and on technical matters affecting equipment.

APPENDIX IV
 (Vide Paras 8 and 21)
LAYOUT CHART OF DEFENCE R & D ORGANISATION
 (As on 7 Feb 67)



* (At present a Deputy Chief Scientist is in position.)

APPENDIX V

(*vide* para 10)

*Essential Features of Defence Research and Development Organisation
U.K. with effect from 1-4-1964.*

I

With effect from 1st April, 1964 a Unified Ministry of Defence have come into existence in U.K. The new Ministry of Defence has absorbed the present Ministry of Defence, Admiralty, War Office and Air Ministry. This Ministry will be headed by a Secretary of State for Defence. The offices of the First Lord of Admiralty and of the Secretaries of State for War and Air have been abolished, together with the Board of Admiralty and the Army and Air Councils. Under the Secretary of State for defence there are now three Ministers of Defence; a Minister for Defence for the Royal Navy, a Minister for Defence for the Army and a Minister for Defence for the Royal Air Force. The Ministers of Defence will be assisted by three Parliamentary Under Secretaries of State for Defence for the Royal Navy, for the Army and for the Royal Air Force.

2. A Defence Council has been established under the Secretary of State and will exercise the powers of command and administrative control previously exercised by the Board of Admiralty and by the Army and Air Councils. The Defence Council will consist of:

The Secretary of State for Defence.

The Minister of Defence for the Royal Navy.

The Minister of Defence for the Army

The Minister of Defence for the Royal Air Force

The Chief of the Defence Staff

The Chief of the Naval Staff and First Sea Lord.

The Chief of the General Staff.

The Chief Scientific Adviser to the Secretary of State for Defence.

The permanent Under-Secretary of State.

3. The Defence Council will deal mainly with major Defence Policy. Management of Services will be exercised by Admiralty, Army and Air Force Boards of the Defence Councils, of each of which the Secretary of State will be Chairman.

4. The Chief Scientific Adviser will be one of the three Principal Advisers to the Secretary of State and his duties covers all aspects of defence research and weapons development. The unified MOD is responsible for monitoring the whole of the national defence research and development programme and allocating resources. As per revised organisation requirements for weapons and equipment on a defence rather than a single service basis and for providing military advice about the defence research and development programme will be formulated by the Defence Operational Requirements staff.

In order to improve the control of Defence Research and weapons development, the present Defence Research Policy Committee will be replaced by two new Committees, both chaired by the Chief Scientific Adviser. These Committees will work closely with the Defence Operational Requirements staff and the Development Secretariat.

First, there will be a Defence Research Committee to oversee all military research which does not directly support approved weapons and equipment projects. The Committee will advise the Secretary of State and Chiefs of Staff on all scientific and technical matters which may affect defence research policy. The Committee will keep the defence research programme under review so as to ensure that it is appropriate to Defence need, and is matched by the resources available. The Committee will in particular bring to notice in good time scientific developments which may be of military interest.

The membership of this committee will be mainly scientific, and will include independent scientists. The problems of defence research are seldom amenable to straightforward analysis and accounting. Judgment will play a major part, and for this reason it is essential to call upon the best advice available from whatever source.

Secondly, since the problems of weapons development are somewhat different, a Weapons Development Committee will be set up. This Committee will advise the Secretary of State and Chiefs of Staff on what major projects should be included in the development programme. It will keep the programme under review so as to ensure that it is properly matched to the available resources, current defence policy, and operational requirements agreed in the light of what is technically feasible. The Committee will be responsible for the prompt detection of any difficulties which may arise in the execution of the programme.

It will be closely linked to the Defence Research Committee by a substantial degree of common membership but since the problems with which it deals will have in varying degree a military, scientific, technical, financial and economic content, it will draw to a larger extent on military and administrative staffs.

The Ministry of Aviation will be represented on both the Defence Research Committee and the Weapons Development Committee.

RESEARCH AND DEVELOPMENT ORGANISATION—U.K.

(As furnished by the Ministry of Defence)

Secretary of State for Defence

I	I	I
MINISTER OF STATE FOR DEFENCE ROYAL NAVY	MINISTER OF STATE FOR DEFENCE ARMY	MINISTER OF STATE FOR DEFENCE ROYAL AIR FORCE
CHIEF OF STAFF & CHIEFS OF STAFF		
CHIEF SCIENTIFIC ADVISER		
I	I	I
DEFENCE OPERATIONAL REQUIREMENTS STAFF— FORMULATION OF WEAPONS EQUIPMENT DEVELOPMENT	DEPUTY CHIEF SCIENTIFIC ADVISER (STUDIES)	DEPUTY CHIEF SCIENTIFIC ADVISER (PROJECTS)
	NUCLEAR GROUP	CHIEF SCIENTISTS ROYAL NAVY, ARMY & ROYAL AIR FORCE
DEFENCE RESEARCH COMMITTEE		
DEFENCE RESEARCH COMMITTEE		
OPERATIONAL RESEARCH COMMITTEE		
WEAPONS DEVELOPMENT COMMITTEE		

FROM NEWSPAPER REPORTS PUBLISHED IN JANUARY 1967, IT IS UNDERSTOOD THAT THE POSTS OF CHIEF SCIENTIFIC ADVISER AND THE DEPUTY CHIEF SCIENTIFIC ADVISER (PROJECT) HAVE BEEN ABOLISHED. INSTEAD THE DEPUTY CHIEF SCIENTIFIC ADVISER (STUDIES) IS TERMED AS CHIEF ADVISER (STUDIES).

APPENDIX VI

(Vide Para 10)

SALIENT FEATURES OF DEFENCE R & D SET-UP IN CANADA

Defence research in Canada is the responsibility of Defence Research Board (D.R.B.). The Chairman of D.R.B. is S.A. to Minister of National Defence and has the status of a Chief of Staff.

Defence Research Board

The Board is comprised of Chairman, Vice-Chairman (both appointed by Governor-in-Council), Secretary, Chiefs of Services, Deputy Minister of National Defence and President of N.R.C. and 7—9 members from universities and industry. The Board is responsible:

- (a) To provide scientific advice to the Minister of National Defence, to the Chiefs of Staff and to the Armed Services.
- (b) To contribute to collective security.
- (c) To provide for the research needs of Armed Services.
- (d) To encourage and support basic research of defence interest in Canadian Universities and applied research of defence interest in Canadian industry.

Within the Board there have been established number of committees designed to assist and advice Chairman in reaching a decision. Some of them are:—

- (i) The Defence Research Management Committee.
- (ii) The Research Projects Control Committee.
- (iii) The Defence Industrial Applied Research Advisory Committee.
- (iv) The Committee on Development.

Organisation

The research organisation consists of headquarters and 8 research establishments.

Headquarters have the dual control of normal function of direction and control and additional responsibility of interpreting results of research to Armed Service.

Research establishments include a small number of seconded Service Officers, who are integrated into research teams. Each establishment within the policies of D.R.B. is autonomous. The promulgation of directions and instructions by the Board are kept minimum and provide for the considerable amount of discretion on the part of the head of the establishment. Each establishment has a reasonably free hand in administration of its own finances.

Development Projects

Development Projects are initiated by each of the armed services and D.R.B. bears the responsibility that the proposed development projects are scientifically and technically feasible before giving contracts to industry.

Grants-in-aid are given to individuals in the Universities to work on unclassified problems of defence interest, on the basis of recommendations from advisory committees and panels composed of members of high professional standing in their field.

Liaison with Services

In the sphere of policy, the Chairman D.R.B. has the status of a Chief of Staff and hence is a member of the Chiefs of Staff Committee and Defence Council. This provides the essential liaison at the senior levels in the matter of both operational and administrative policy.

Besides this, D.R.B. staff officers are members of a Joint, inter-service and inter-departmental committees dealing with specific areas of activity in which defence science is a factor.

Research establishments include a small number of seconded services officers, who are integrated into research teams.

Some scientists are deputed to Service Operational Research Directorates.

. P E N D I X V I I
(Vide Para 10)

E S S E N T I A L F E A T U R E S O F D E F E N C E R E S E A R C H A N D D E V E L O P M E N T
O R G A N I S A T I O N I N A U S T R A L I A

Organisation

The major part of Defence Research & Development is under the control of the Department of Supply, but there are small areas of research and development in the departments of Army, Navy and Air. However, these latter are of insufficient magnitude.

Within this department of Supply, research and development is under the direction of the Chief Scientist, who is assisted by two controllers.

There is also a Board of Management for R & D which scrutinizes each proposed project and makes its recommendations to the secretary.

The laboratories controlled by the department of Supply comprise the following:—

- (a) Aeronautical Research Laboratory.
- (b) Defence Standards Labs.
- (c) Weapons Research Establishments.

These laboratories are primarily concerned with the solution of problems related to (a) the Australian Armed Services, (b) Testing of UK guided missiles, and (c) UK and US upper atmospheric and space research.

Authorisation of Technical Programme

New programme items arise from overseas requests for guided weapons or space research trials, from requirements of the Australian Services, or from internal developments. Each major proposal is considered by the Board of Management of R & D. If satisfied, the Board's recommendations are passed by the Secretary to the Minister for Supply who after his approval forwards the proposal to the Department of Defence.

In the Department of Defence, the proposal is examined by the Defence Research & Development Policy Committee in the light of over-all

Defence policy and requirements. Then it goes to the Defence Committee and finally to the Defence Minister who may either approve the project, or submit it to the Cabinet for final consideration.

Once approval is obtained, the proposal is formally included as a programme item for the laboratories. Other programmes of laboratories comprise basic research and *ad-hoc* short term investigations to meet urgent Defence operational and manufacturing difficulties. In the field of basic research, use is made of universities by allocation of funds to them annually to support work in approved fields. This is almost the only possibility of securing additional help in basic research science. Australian industry is not very well equipped for this purpose.

The progress of the programmes is reviewed by the Defence R & D Policy Committee.

Reviews of US Space Research items are dealt with individually.

UK-Australian guided weapons trials etc are reviewed by the Joint Project Policy Advisory Committee.

APPENDIX VIII

(*Vide Para 10*)

ESSENTIAL FEATURES OF DEFENCE RESEARCH AND DEVELOPMENT ORGANISATION IN U.S.A.

Organisation

At the top of the Defence R & D set-up in USA is the Director of Defence Research & Engineering (DDRE) who is the principal adviser and staff executive for the Secretary of Defence in research and development areas. In this capacity, the functions of the DDR&E include supervising all research and engineering activities of all the three Services *viz.* Army, Navy and Air Force under the Department of Defence. DDRE has the authority to approve, modify or disapprove programmes and projects of the Services Departments, to eliminate unpromising or unnecessarily duplicate programmes and to initiate and support promising ones for research and development.

DDRE also has under him two other agencies *viz.* the Weapon System Evaluation Group (WSEG) and Advanced Research Projects Agency (ARPA) besides an Advisory body *viz.* Defence Science Board. WSEG provides operational analysis on weapons systems to the joint chiefs of staff, DDR&E and other interested agencies in the Office of the Secretary of Defence. The ARPA was created in 1958 to provide a central defence agency, which was lacking till then, responsible for long term research. ARPA is thus concerned with centralised management of selected research projects stemming from advanced ideas and requiring long range study in fields such as ballistic missile defence, nuclear test detection remote-area conflict, behavioral sciences, information processing techniques, energy conversion, propellant chemistry and materials sciences.

Apart from the above, the three Services Army, Navy and Air Force have their own R & D set-ups. Under the Secretary of Army is one Director of R & D Equivalent to an Assistant Secretary of Army. He is authorised and directed to act for the Secretary of Army in matters relating to research, development, testing and evaluation.

The Chief of R & D (C R&D) is one of the principal staff officers under the Chief of (Army) Staff and ranks as a Deputy Chief of Staff. He exercises staff functions of planning and coordinating the Army's research, material development, testing and evaluation activities, including justifying and establishing controls over the annual army budget for these functions.

The Army Material Command (AMC) is one of the major field commands and has the executive control of entire materials research, development, production, procurement, inspection and distribution activities in the Army. The A.M.C. has been sub-divided into seven major subordinate commands—five of which are known as Commodity Commands. Research Laboratories, Boards, Agencies and field offices are also under the AMC. Five commodity commands are responsible for its commodities for research, development and design, cataloguing and standardisation, procurement, production and purchase, quality control, wholesale inventory management, maintenance engineering, technical advice etc.

Process of Material Development

Future user requirements for material are developed by the Combat Development Command. They formulate the Qualitative Material Requirement (QMR) and Small Development Requirement (SDR) and Qualitative Material Development Objective (QMDO). These are routed through OCR&D for approval and acceptance before being sent to AMC for committing R&D effort in any of its subordinate commands or other attached activities. Items and designs developed by AMC after being found satisfactory on test and evaluation and having been accepted by the Combat Development Command, are finally approved by the C R&D before introduction.

APPENDIX IX

(Vide Para 11)

CONSTITUTION OF DEFENCE R & D COUNCIL

Copy of Government of India, Ministry of Defence Office Memorandum No. 93877|RD-27|3292|CG (Admin.) dated 11th April, 1962 to the Scientific Adviser to Defence Minister and Director General, Research and Development and others.

SUBJECT: *Constitution of Defence Research and Development Council (DR & DC) in the Ministry of Defence.*

The Defence Research and Development Organisation was formed on 1st January, 1958. The Government has had under consideration the reorganisation of its administrative set up to accelerate the rate of progress in defence research and development. The President has now been pleased to sanction the formation of a Defence Research and Development Council in the Ministry of Defence.

2. The Defence Research and Development Council will be responsible for coordination and directing scientific research relating to the defence of India and the development of, or improvement in, material required by the Armed Forces, within the sanctioned budget provision for approved schemes and subject to observance of the general financial principles of Government, the Council will have full powers to sanction expenditure relating to such schemes. A lumpsum provision will also be included in the budget to cover expenditure on research and development projects sanctioned during the course of the year subject:—

- (a) the total cost of any such project not exceeding Rs. 5 lakhs and
- (b) any commitment in respect of any project in the financial years following that in which it is sanctioned being met out of the lumpsum provisions for those years, unless it is included in the sanctioned budgets of the following years.

The Council will exercise the full administrative powers of the Ministry of Defence in matters relating to establishment, the control over staff, etc. belonging to it. The number for Finance i.e. the Financial Adviser shall have the right to ask that any matter having financial implications, in which he does not agree with the Council, should be referred to the Chairman, who will inform the Finance Minister as soon as possible.

Decisions of the Council will be promulgated in orders of the Ministry of Defence and communicated to audit and accounting authorities in the prescribed manner.

3. The Council will be constituted as given hereunder:—

Constitution of the Council

Chairman	Defence Minister
Vice-Chairman	Minister of Defence Production.
Members	Defence Secretary Scientific Adviser Secretary Defence Production Financial Adviser
Chief of the Army Staff Chief of the Naval Staff Chief of the Air Staff	} The Deputy Chief of the Staff when the Chief of Staff is unable to attend the meeting.
Director General of Armed Forces Medical Services.	
Director General, C.S.I.R.	
C.G.I.P. (now designated as DGI) CC R&D	
Secretary—Deputy Secretary of Ministry of Defence nominated by the Chairman.	

4. *Functions:*

- (a) to formulate programmes in regard to research and development; training of personnel and associated matters and, where necessary, to obtain the approval of Government;
- (b) to consider proposals relating to the Defence R & D budget for each financial year and submit them for the approval of the Government;
- (c) to implement Government's orders in all matters concerning defence research and development;
- (d) to review work done in the research and development wings of the Scientific Adviser's Organisation in the Ministry of Defence;
- (e) to liaise with organisations dealing with scientific research and development.

5. *Executive Committee of Defence R & D Organisation*—Within the limits of the budget provisions sanctioned by the Government and subject to any conditions the Council may prescribe, the Council may

delegate any of its powers, administrative or financial, to an Executive Committee, presided over by the Scientific Adviser to the Minister of Defence.

Committee will be constituted as follows:

Chairman	Scientific Adviser
Members	CC R & D C.G.I.P. (now DGI) Chief Scientist DTD&P (AIR) A representative of the Defence Ministry A financial officer nominated by the financial Adviser. Director of Weapons and Equipment. A representative of DGAFMS will attend when any of the items relating to medical research are considered.
Secretary	Under Secretary (R& D).

In the absence of the Scientific Adviser, the Executive Committee will be presided over by the CC R & D.

6. The Finance Officer shall have the right to ask that any matter having financial implications, in which he does not agree with the Committee, shall be referred to the Council.

7. The above arrangement shall come into force with effect from 11th April 1962.

APPENDIX X

(Vide para 12)

CONSTITUTION OF DEFENCE R & D COUNCIL

Copy of Government of India, Ministry of Defence Office Memorandum No. 93877|RD-27|611|DRDC, dated 27th March, 1963 to the Scientific Adviser to the Minister of Defence and Director General, Research and Development and others.

SUBJECT: *Constitution of the Defence Research and Development Council in the Ministry of Defence.*

The undersigned is directed to invite a reference to para 6 of this Ministry's O.M. No. 93877|RD-27|3292|CG (Admin.), dated 11th April, 1962, as amended by O.M. No. 93877|RD-27|13542|1|CG (Admin.), dated 10th December, 1962 and to say that the following financial and administrative powers have been delegated by the Defence Research and Development Council to the Executive Committee:—

Financial

- (a) To sanction new research/development projects upto Rs. 3 lakhs in each case out of the lump sum provision made for this purpose in each financial year. A report of such sanctions will be rendered by the Executive Committee to the Council.
- (b) To deal with proposals for increase in establishment where estimated cost of increase is not more than Rs. 2 lakhs per annum, provided Budget provision exists. Decisions of the Executive Committee will be promulgated in orders of Ministry of Defence and communicated to audit and accounting authorities in the prescribed manner.

Administrative

- (a) To review periodically the progress of research and development work done in the Organisation and report to Defence Research and Development Council.
- (b) To arrange liaison with Laboratories and other Organisations doing scientific, research and development work and periodically review progress.

- (c) To examine half-yearly the progress of expenditure out of the sanctioned budget.
- (d) To examine the forecast budget estimates of each Estt./Lab. with particular reference to the following and to submit them for approval of the Defence Research and Development Council.
 - (i) the projects to be taken up during the year;
 - (ii) purchase programme of the year; and
 - (iii) additional manpower/equipments.

APPENDIX XI

(Vide para 39, 41 and 52)

MODEL CONSTITUTION FOR SCIENTIFIC LABORATORIES

No. 84/13/CF-64

GOVERNMENT OF INDIA

CABINET SECRETARIAT

(Department of Cabinet Affairs)

New Delhi, the 16th April, 1964.

SUBJECT: *Model constitution for institutions and laboratories concerned with scientific research.*

The undersigned is directed to say that the question of the right kind of internal organisation and management for institutions and laboratories concerned with scientific research was recently considered by the Scientific Advisory Committee to the Cabinet. The Committee felt that the ordinary organisation of government departments and offices was not suitable for research institutions and laboratories; and that the organisation and procedures of the research institutes and laboratories should be such as to enable those bodies to carry on the work of scientific research and development with the maximum of efficiency and the minimum of administrative red-tape. The Committee accordingly drafted the following model constitution containing the general principles which should govern the internal organisation of all scientific institutions and laboratories:

- (i) It should be recognised that scientific work is the primary objective of every institution and laboratory concerned with scientific research and that administration is only ancillary to it. The Head of every such institution and laboratory should be a scientist of appropriate calibre; particularly in the case of an institution mainly devoted to research, the Head of the institution should be a scientist who has distinguished himself in research. The purpose of purely administrative officers in such institutions should be to relieve the scientists of routine administrative work; but it must be clearly emphasised that the final decision should always rest with the scientist whom the administrative officers are there to assist.
- (ii) Each institution and laboratory concerned with scientific research should have a Governing Council of about 7 members,

which should be the highest executive body of the institution. The Head of the institution or Director should be a member of the Governing Council.

- (iii) The role of the Governing Council is to consider and approve the programmes of the institution within the scope of the prescribed objectives of the institution and within the scope of its budget, and to see that they are implemented. The Governing Council should scrutinise plans for development; consider, approve and operate the budget; and make the appointments.
- (iv) There should be a clear provision for the delegation of powers from the Governing Council to the Director and through him, or directly, to other members of the staff or to Committees. Appointments and promotions up to a certain level, deputations, sanction of leave, etc., in respect of staff should be taken care of under delegated powers. The appointment of appropriate committees of members of the staff is important for the smooth and effective functioning of the institution. Such committees could look after the library, the workshop, laboratory stores, etc.
- (v) Every institution should have qualified accountants, who are also qualified auditors, whose business it is to anticipate difficulties, assist in resolving them and help the Director to devise procedures which will enable the work of the institution to be carried forward smoothly and effectively.

2. The Cabinet has approved the general principles contained in the above model constitution for adoption by Government institutions and laboratories concerned with scientific research. It is requested that these general principles may be communicated for adoption, to the government institutions and laboratories concerned with scientific research under the control of the Ministries|Departments.

Sd/- T. S. ANANTAKRISHNAN,

Under Secy. to the Cabinet.

To

The Secretaries of the Ministries/Departments.

APPENDIX XII

(Vide Para 40)

LIST OF DEFENCE RESEARCH AND DEVELOPMENT ESTABLISHMENTS LABORATORIES

Armaments Group

1. Armaments Research and Development Establishment, Kirkee.
2. Explosives Research and Development Laboratory, Kirkee.
3. Defence Metallurgical Research Laboratory, Hyderabad.
4. Defence Research and Development Laboratory, Hyderabad.
5. Instruments Research and Development Establishment, Dehra Dun.
6. Proof and Experimental Establishment, Balasore.
7. Terminal Ballistics Research Laboratory, Chandigarh.

Electronics Group

8. Electronics and Radar Development Establishment, Bangalore.
9. Defence Electronics Research Laboratory, Hyderabad.
10. Solid State Physics Laboratory, Delhi.
11. Himalayan Radio Propagation unit, London (Originally field station, London).

Engineer Group

12. Research and Development Establishment (Engineers) Dighi near Kirkee.

Vehicles Group

13. Vehicles Research and Development Establishment, Ahmednagar.

Aeronautics Group

14. Aeronautical Development Establishment, Bangalore.
15. Gas Turbine Research Establishment, Bangalore.

General Research Laboratories Group

16. Defence Science Laboratory, Delhi.

17. Defence Research Laboratory (Materials), Kanpur.
18. Institute of Nuclear Medicine and Allied Sciences, Delhi.
19. Defence Laboratory, Jodhpur.
20. Defence Food Research Laboratory, Mysore.
21. Naval Chemical and Metallurgical Laboratory, Bombay.
22. Indian Naval Physical Laboratory, Cochin.
23. Defence Institute of Physiology and Allied Sciences, Madras.
24. Fire Service Research, Development and Training Establishment, Delhi.
25. Field Laboratory, Leh. (Including Agricultural Research Farm Murtish Leh, Agricultural Farm Ranbirpura, Leh and Animal Husbandry Farm, Leh.)
26. Field Laboratory, Gulmarg.
27. Field Laboratory, Tezpur.
28. Applied Psychological Laboratory, New Delhi.

Training Institutes

29. Institute of Armament Technology, Poona.
30. Institute of Work Study, Landour Cantt., Mussoorie.

Miscellaneous

31. Scientific Evaluation Group, New Delhi.
32. Directorate of Psychological Research, New Delhi.
33. Scientific Analysis Group, New Delhi.

APPENDIX XIII

(Vide Para 45)

**CORRESPONDENCE BETWEEN AHQ AND CFTRI ON
EMERGENCY RATION**

DELHI TELEPHONE 31628
MILITARY TRUNK 422

No. 68372/Q/ST6D
ARMY HEADQUARTERS
Quartermaster General's Branch
DHQ P.O. New Delhi-11
9 May, 1960

19 Vaisakha, 1882

To

The Director
Central Food Technological Research Institute,
Cheluvamba Mansion,
V. V. Mohalla, P.O. MYSORE.
SUBJECT: *Emergency Ration.*

Dear Sir,

1. A proposal is under consideration for inclusion of Gur and puffed rice cake as emergency ration for Armed Forces.
2. This is a candy cake with its main ingredients as Gur, puffed rice, oil hydrogenated with Almonds, grams or sesame. It is a popular variety used commonly in North India. The heating process involved and the ingredients recommended make it nourishing and durable.
3. Please carry out trials and send us samples of candy cake for analysis by 31 May 60. The sample with almonds, grams and sesame be prepared separately and also two or more of them mixed together.
4. The details regarding composition and packing should be decided by you, taking into consideration its palatability, nourishing and durability.

Yours faithfully,

Sd./- S. S. KOCHAR.

Major,

Director of Supplies and Transport

CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE

CHELUVAMBA MANSION

V. V. MOHALLA P.O.

May 18, 1960

Date: _____

Vaisakha 28, 1882

No. FT|IS-31|(1)|60-5404.

THE DIRECTOR,

CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE
MYSORE.

The Director of Supplies and Transport,

Army Headquarters,

Quartermaster General's Branch,

DHQ PO NEW DELHI—11.

Dear Sir,

SUBJECT: *Emergency Ration*

Kindly refer to your letter No. 68372|Q|STGD dated 9th May 1960 on the above subject which we acknowledge with thanks and have to state that on account of our preoccupations, it is not possible for us to undertake immediate trials with the preparation of candied cake using the ingredients suggested by you. Under these circumstances, we regret our inability to send you a sample.

Regretting our inability to be of help to you at this stage but assuring you of our co-operation,

Yours faithfully,

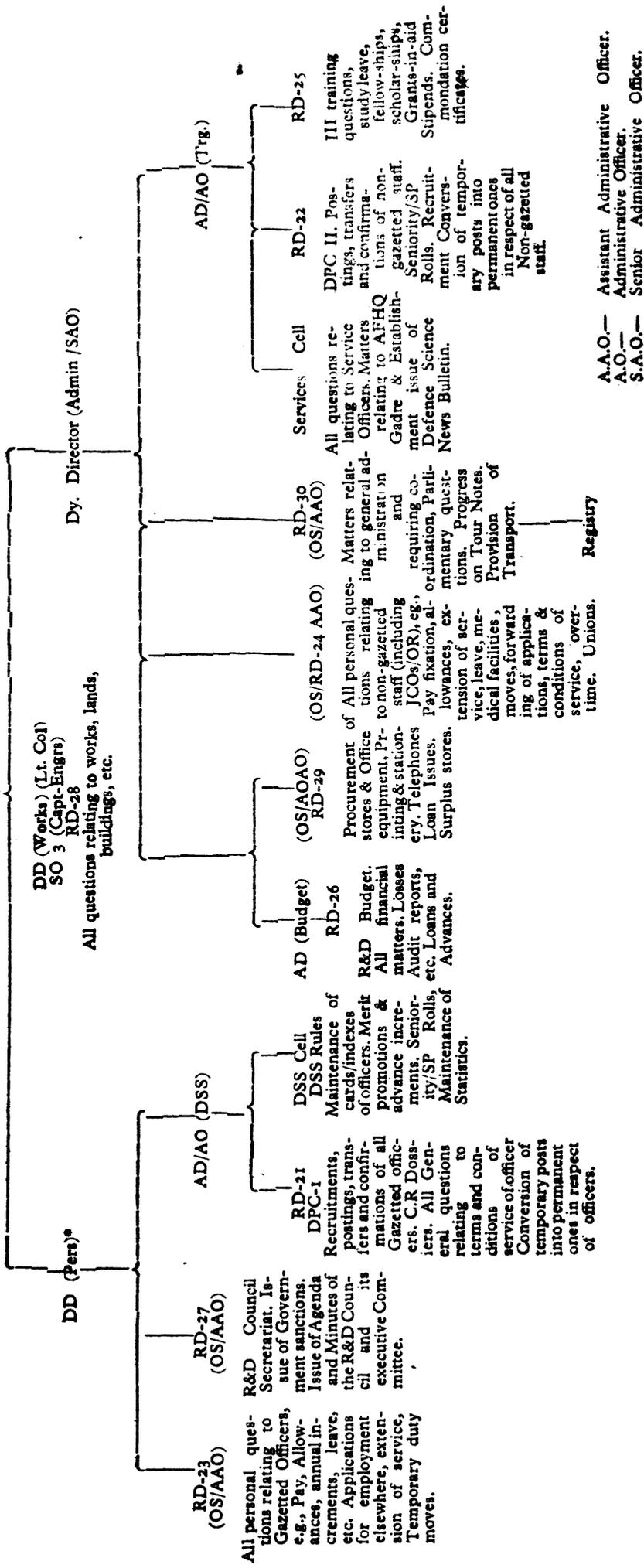
Sd|- B. C. BHUTANI

Assistant Director,

Dyn. of Food Information, Statistics and Extension Services.

APPENDIX XIV
(Vide Para 51)

DIRECTOR OF ADMINISTRATION



* Post held in abeyance.

APPENDIX XV

(Vide para 53)

Percentage of expenditure on administration to total expenditure on each R&D Establishment/Laboratory during Third Five Year Plan

Est./Lab.	1961-62	1962-63	1963-64	1964-65	1965-66	Mean
ARDE	17.20	14.50	12.40	15.90	14.70	14.94
ERDL	12.80	11.50	11.70	13.40	14.20	12.72
DRDL	19.70	20.90	17.70	10.70	16.10	17.02
DMRL	..	..	..	16.30	18.80	17.55
IRDE	24.30	22.10	21.00	23.70	21.40	22.50
TRRL	50.70@	28.50	23.50	21.50	19.90	28.82
PEE	19.70	19.40	10.10	12.40	12.20	14.76
RDE (Engrs.)	..	24.20	21.90	25.10	23.00	23.54
ADE	15.10	16.20	17.30	17.50	16.90	16.60
GTRE	7.70	9.90	7.30	9.00	9.30	8.64
LRDE	19.70	17.50	17.00	16.60	19.00	17.96
DLRL	16.80	19.50	22.10	20.50	20.60	19.90
SPL	..	18.20	13.20	12.90	15.80	15.02
DSL	12.80	10.20	12.80	13.00	14.40	12.64
DRL (M)	21.00	21.00	20.00	19.00	18.00	19.80
DFRL	21.90	13.80	15.30	16.10	16.80	16.78
DLJ	22.80	19.80	18.10	20.50	19.50	20.14
DIPAS	..	18.60	24.90	19.80	17.20	20.12
INMAS	..	20.10	23.90	24.90	18.10	21.75
NCML	9.30	8.60	9.50	11.50	10.80	9.94
INPL	11.80	13.80	12.90	12.90	12.70	12.82
IAT	14.70	10.40	14.10	16.00	16.70	14.38
FSRD & Trg*	..	..	34.00	35.30	41.30	36.86
IWS*	..	43.40	54.10	59.60	51.70	52.20
HRPU	..	..	..	..	45.20	45.20

NOTES: (i)— VRDE was formed during the course of the year 1965-66 and as such expenditure for the whole year is not available.

- (ii) “..” indicates not in existence.
- (iii) * These are primarily training Establishments and hence the percentage is higher.
- (iv) £ The high percentage is due to the fact of its formation in 1965 when a good number of Scientific posts were unfilled.
- (v) @ The high percentage is due to the fact of its formation in 1961 when a good number of Scientific posts were unfilled.

APPENDIX XVI

(Vide second Footnote to Para 53)

Percentage of Administrative Expenditure (Total Pay and Allowances only) to Total Pay and allowances of Entire Staff.

Establishment	1961-62	1962-63	1963-64	1964-65	1965-66	Total	Mean average
A.R.D.E.	19.7	16.7	15.9	17.4	16.9	86.6	17.3
E.R.D.L.	13.1	12.3	12.0	15.5	17.1	70.0	14.0
D.R.D.L.	19.8	19.2	19.1	17.4	17.4	92.9	18.6
D.M.R.L.	..	..	..	17.6	18.8	36.4	18.2
I.R.D.E.	25.4	22.5	21.2	23.0	21.0	111.2	22.4
T.B.R.L.	36.7	27.0	22.6	22.4	20.3	29.0	26.0
P.E.E.	20.2	20.3	18.9	17.2	18.2	94.8	19.0
R.D. (Eng.)	..	25.5	24.1	25.0	22.2	96.8	24.2
A.D.E.	16.0	16.8	18.0	17.4	15.2	83.4	16.7
G.T.R.E.	9.3	11.5	10.1	10.6	10.9	52.4	10.5
L.R.D.E.	20.9	18.6	19.1	18.4	19.8	96.8	19.4
S.S.P.L.	..	22.9	21.2	22.1	21.7	87.9	22.0
D.L.R.L.	15.9	21.1	25.0	21.8	21.4	105.2	21.0
H.R.P.U.	..	..	..	..	46.8	46.8	46.8
D.S.L.	13.3	13.9	14.7	14.6	15.4	71.9	14.4
D.R.L. (M)	23.3	25.4	24.2	22.7	20.6	116.2	23.2
D.F.R.L.	3.5	16.2	17.5	20.8	18.5	76.5	15.3
D.L. (J)	24.4	22.0	20.0	21.5	20.7	108.6	21.7
D.I.P.A.S.	..	22.8	32.3	24.0	19.4	98.5	24.6
I.N.M.A.S.	..	18.4	23.3	24.9	18.9	85.5	21.4
N.C.M.L.	10.0	11.2	14.0	15.6	15.8	66.6	13.3
I.N.P.L.	11.0	12.8	12.6	12.9	12.3	61.6	12.3
I.A.T.	18.4	19.8	17.8	19.4	19.5	94.9	19.0
I.W.S.	..	42.9	47.2	48.9	43.7	182.7	45.7
F.S.R. & D. Trg.	..	..	48.5	53.0	51.8	153.3	51.1

NOTES :—1. (..) indicates not in existence.

2. H.R.P.U. was formed in 1965 and a good number of Scientific posts were not filled up.

3. IWS, and FSRD & Trg. are training institutions.

4. R&D (Engg.) and DRL (M) perform inspection functions as well.

APPENDIX XVII

(Vide para 54)

**FINANCIAL POWERS OF HEADS OF ESTABLISHMENTS/
LABORATORIES**

No. 93916/RD-26/11088/D(R&D)

GOVERNMENT OF INDIA

Ministry of Defence

New Delhi, the 31st October, 1966

To

The Scientific Adviser to the Minister of Defence and Director General, Defence Research and Development NEW DELHI.

SUBJECT: *Financial Powers of Heads of Establishments/Laboratories.*

Sir,

I am directed to convey the sanction of the President to the delegation of further powers as listed in the Annexure 'B' to this letter to the Heads of Establishments mentioned in the Annexure 'A'.

2. The Ministry's letter No. 93916/RD-26/1504/D(R&D), dated 15-2-1966 is hereby cancelled.

3. This issues with the concurrence of Ministry of Finance (Defence) U.O. No. 5923/Proj-II, dated 26th October, 1966.

Yours faithfully,

(Sd/-) (M. R. SHARMA),

Under Secy. to the Govt. of India.

Copy to:

The Controller General of Defence Accounts, New Delhi etc. etc.

*Annexure 'A' to Min. of Defence letter No. 93916/RD-26/11088/
D(R&D) dated 31st October, 1966*

Establishment/Laboratory

1. Defence Metallurgical Research Laboratory, Hyderabad.
2. Defence Research and Development Laboratory, Hyderabad.
3. Terminal Ballistics Research Laboratory, Chandigarh.
4. Instrument Research and Development Establishment, Dehra Dun.
5. Explosive Research & Development Laboratory, Poona.
6. Armament Research and Development Establishment, Poona.
7. Electronics & Radar Development Establishment, Bangalore.
8. Solid State Physics Laboratory, Delhi.
9. Defence Electronics Research Laboratory, Hyderabad.
10. Himalya Radio Propagation Unit, Mussoorie.
11. Research & Development Establishment (Engineers), Dighi.
12. Gas Turbine Research Establishment, Bangalore. Poona.
13. Aeronautical Development Establishment, Bangalore.
14. Vehicle Research and Development Establishment, Ahmednagar.
15. Defence Science Laboratory, Delhi.
16. Institute of Nuclear Medicine & Allied Sciences, Delhi.
17. Defence Institute of Physiology & Allied Sciences, Madras.
18. Indian Navaly Physical laboratory, Cochin.
19. Naval Chemical & Metallurgical Laboratory, Bombay.
20. Defence Research Laboratory (Materials), Kanpur.
21. Defence Laboratory, Jodhpur.
22. Defence Food Research Laboratory, Mysore.

***Annexure 'B' to Ministry of Defence letter No. 93916/RD-26/11088/
(D) (R&D) dt. 31st Oct. 1966.***

Sl. No.	Nature of power	Extent	Conditions, if any
1	2	3	4
1	Advances from GP Fund IOFWP Fund and IODP Fund	Full including final withdrawal	Subject to conditions prescribed from time to time in Government orders

1	2	3	4
2	Advance of TA for journeys on temporary duty	Full	Subject to conditions laid do in AI 199 of 1961.
3	To make appointments	Class III and Class IV.	Subject to observance of general orders.
4	Grant of casual leave to employees for participation in sporting events	Full	Subject to conditions prescribed in Ministry of Defence Memo No. 27(37)/53/ 1915/L/D(Appts.) dated 23-7-54 as amended.
5	Change in home town	Full	In respect of non-gazetted/Industrial Establishment and subject to conditions as may be prescribed by the Govt. from time to time.
6	Direct purchase of stores	Upto Rs. 20,000	(i) the limit is in respect of each item or number of similar items purchased a one time; (ii) in respect of Rate/Running contracts the limit is Rs. 400/- in each case and Rs. 4,000/- in aggregate in a year. (iii) observance of general conditions prescribed. These powers will not apply to purchase of stationery, office contingencies etc.
7	Development Projects sanctioning of	(i) Upto Rs. 10,000/- for study projects. (ii) Upto Rs. 20,000/- for Panel approved projects.	These powers will also be operative for placement of development orders/contracts on trade/Public Sector Undertakings etc.
8	Local Purchase of Books of Indian origin	Full powers subject to cost of each book not exceeding Rs. 100.00	Subject to availability of funds within the sanctioned allocations.
9	Fixation of higher initial pay on first appointment to Class III posts.	Upto 3 advance increments	Subject to recommendations of the Selection Committee in respect of posts.
10	Grant of Special pay to Gestetner Machine Operators.	Full	Subject to conditions prescribed in Ministry of Defence letter No. 2(4)/62/8643/D(Civ-I) dated 21-9-62 as amended.
11	Grant of special pay to Cashiers.	Full	Subject to conditions prescribed in Ministry of Defence O.M. No. 2(32)/761/11013/D(Civ-I) dated 23-10-63

APPENDIX XVII

(Vide para 54)

Statement showing Establishments/Laboratories headed by Officers of the grade of Director Grade I, Director Grade II, Deputy Chief Scientific Officer and Principal Scientific Officer

GROUP	NAME OF R&D ESTT/LAB.	AUTHORISED RANK OF THE HEAD	ACTUALLY HELD BY
1	2	3	4
ARMAMENTS	ARDE KIRKEE (PASHAN)	Director Grade I	Brig.
	ERDL, KIRKEE	Director Grade II	Director Grade II
	IRDE DEHRADUN	Director Grade I	P.Sc. O
	DMRL HYDERABAD	Director Grade I	Director Grade I
	DRDL HYDERABAD	Director (Brig./Air Cdre)	Air Cdre
	TBRL CHANDIGARH	Director Grade II	Director Gde. II
	P & EE BALASORE	Supdt (Colonel)/ (Capt IN) (equivalent to Director Gde II)	Director Gde II Co.
	ELECTRONICS	LRDE BANGALORE	Director (Brig)	Brig.
SSPL DELHI		Director Gde I	Director Gde II
DLRL HYDERABAD		Director Gde I	Director Gde II
HRPU LANDOUR		P.Sc.O (O.i/c)	P.Sc. O.
LABORATORIES	DSL DELHI	Director Gde I	Director Gde I
	DL JODHPUR	Director Gde II	P.Sc.O.
	DRL (M) KANPUR	Director Gde II	Director Gde II
	DIPAS MADRAS	Director Grade II	Surg Cdr. I.N.
	INMAS DELHI	Director Grade II	Lt. Col.
	INPL COCHIN	Director Grade II	DCSO
	NCML	Director Grade II	P.Sc.O.
	ESRD & T ESTT DELHI CANTT	P.Sc.O.	P.Sc.O.
	DFRL	Director Grade II	P.Sc.O.
	Field Res Lab. LEH	Lt Col. (equivalent to P.Sc. O.)	Lt. Col.
	SA to GOC-in-C All Commands	P.Sc.O	P.Sc.O.
	AFD Unit Delhi Cantt.	P.Sc.O.	P.Sc.O.

1	2	3	4
ENGINEERING	R&D ESTT (ENGRS) DELHI	Director (Brig.)	Brig.
TRAINING	IAT POONA DIWS LANDOUR	Director Gde I Director (Col/ Capt I.N.)Gp Capt.	Commodore I.N. Capt. I.N.
AERONAUTICS	GTRE BANGA- LORE	Director (Gp Capt.)	Gp Capt.
	ADE BANGALORE	Director Gde II	DCSO
VEHICLES	VRDE AHMEDNAGAR	DCSO	DSSO

APPENDIX XIX

(Vide Para 56)

Qualifications for tenure appointment and permanent retention with the research and Development & Inspection Orgns.

Technical Division	Qualification/Experience	
	Tenure Appointment	Permanent Retention
I	2(a)	2(b)
Armament	<p>Officers possessing at least Inter Science/or equivalent qualifications. In addition, technical qualifications such as Gunnery Staff Course, Ammunition, Technical Officer Course, Advance Armaments Engineering Course, Long Gunnery Course or Weapons Course at Electrical School etc. are desirable. Alternatively, officers who have done the TSO's Course with Armaments as a special subject.</p>	<p>Must have qualified at the TSO's Course or equivalent Weapon specification. In respect of Naval Officers—Degree in Engineering or Electrical specification Course.</p>
Vehicles	<p>Officers who are Graduates of the Institution of Engineers (India) or equivalent, Officers of Armoured Corps qualified in Vehicle Course.</p>	<p>Officers who have successfully completed with</p> <p>(a) an advanced Mechanical/Automotive Engg.; or</p> <p>(b) TSO's course with vehicles as a special subject.</p>
General Stores	<p>(a) A degree or diploma or equivalent in engineering, textile technology, forestry, or any branch of chemical technology ; or</p> <p>(b) Science qualifications such as B.Sc. or M.Sc. in Chemistry/Physics/Mathematics/Metallurgy ;</p> <p>(c) Have undergone TSOs (Stores) Course.</p>	<p>Same as for " Tenure Appointment".</p>

1	2(a)	2(b)
Electronics	The Officers should have either a recognised engineering qualification in the field of electronics and/or done advanced telecommunication course or a long advanced course on radar technology. Alternatively, officers who have done TSOs course with Electronics as a special subject; or M. Sc. (Physics) with Electronics as special subject.	Same as for "Tenure Appointment".
AMC	(a) A medical qualification included in the First Schedule or the Second Schedule or Part II of the Third Schedule excepting the Licentiate qualifications included in the Schedule to the Medical Council of India Act, 1956 and be registered on any State Medical Register.	Same as for "Tenure Appointment".
	NOTE: Holders of licentiate qualifications included in First and Second Schedule should have passed F.Sc. or Intermediate (Science) examination before taking the licentiate qualifications.	
	(b) Must be graded as a specialist.	
	(c) Desirable—Must have aptitude for research.	

APPENDIX XX

(Vide Para 59)

Statement showing the average time taken in appointment to posts in Defence R & D Organisation

Time taken for advertisement by UPSC after receiving requisition	Time taken upto Interview	Time taken for nominating the candidate	Time taken in verification of character and antecedents of selected candidates	Time taken in issuing the offer of appointment	Time taken by the candidate in joining after being declared medically fit.	Remarks
one month	3 to 5 months	two weeks	three months	Two weeks	three months	It will be seen that the average time taken between advertisement of a DSS post by UPSC and joining of a candidate from outside is one year. The average time taken by a departmental candidate is about 7-8 months since the verification of character and antecedents etc. is negligible.

APPENDIX XXI

(Vide para 71)

No. 89500|1|RD-29(a)

MINISTRY OF DEFENCE

(Research and Development Orgn.)

New Delhi-11, the 31st October, 1966.

PROCUREMENT OF STORES FROM ABROAD

To

All R&D Estts./Labs. as per standard address list 'A'.

SUBJECT: *Procurement of Stores—Submission of Proposals.*

Reference this HQ letter No. 89500|1RD-29(a) dated 22nd Feb. 65.

In the last R&D Conference the Secretary (DP) had expressed the necessity for strict scrutiny of proposals involving release of foreign exchange. After perusal of some of the lists submitted by establishments in response to this Hq. letter No. 89500|19|RD-29 dated 20th June 66 he has expressed dissatisfaction regarding the installation and utilisation of equipment received by establishments from abroad.

2. With a view to exercising stricter control on the release of foreign exchange for procurement of equipment and also for ensuring better utilisation of equipment procured indigenously as well as from abroad it has been decided to recast the standard Questionnaire. The revised standard questionnaire is forwarded herewith and will be taken into use forthwith.

3. As every proposal involving release of foreign exchange is seen personally by the Secretary (DP) it will be ensured that the questionnaire is carefully answered and all relevant information given therein. The questionnaire will be signed personally by the Head of the Estts./Labs., (and only in his absence on leave by his second-in-command).

4. The indigenous clearance certificates issued by DGTD are valid for a period of six months only. These certificates will accompany the standard questionnaire in original and it will be ensured that these are not more than a month old when the proposal is initiated so as to give sufficient time for obtaining release of foreign exchange and raising of the indent within the validity of the clearance certificates.

5. All demands for equipment costing Rs. 1 lakh and over are required to be scrutinised by a Central Committee at this HQ. To help the Committee in its work it has been decided that all such demands will first be considered by a Board of Officers consisting of the Head of the Estt. and two senior officers of the sponsoring Estt. and the Board of the proceedings will be submitted to this HQ as an Appendix to the Standard Questionnaire. The Board will take into consideration whether or not the equipment demanded is available with a neighbouring R&D Estt. If available whether this is being fully utilised and whether the procurement of a second equipment for the same station is absolutely essential. If the equipment is not available the Board may consider how the procurement of the equipment may help the neighbouring Estt. also.

6. As the foreign exchange position is extremely acute, Establishments before submitting proposals may please ensure that equipment similar to the ones on demand are not available from Rupee payment Areas e.g. G.D.R. Hungary, Poland, etc.

Sd/- Dir. (Admin.)

*for Director General Research and
Development (R. M. Chakravarty)*

Copy to:—All Tech. Directors.

**QUESTIONNAIRE FOR ACCEPTANCE OF NECESSITY FOR
PROCUREMENT OF MACHINE AND EQUIPMENT**

Technical

1. (a) Nomenclature of the item.
(b) Country from where being imported.
2. Is the item required for any particular project? If so, give
 - (a) Name of the Project.
 - (b) Object of Project.
 - (c) Estimated cost of project.
 - (d) Name of authority sanctioning the project.
3. (a) If not required for any particular project is the item demanded a general workshop/laboratory equipment?
(b) If so, indicate the number of hours per day the item will be in use.
4. If the item is approved what will be the extra commitment by way of.
 - (a) Accommodation.
 - (b) Staff.
 - (c) Facilities.
5. (a) Is the proposal inescapable?
(b) What would be the effect if not provided?
6. Is the item demanded a complete equipment/component/accessory?
7. Is the item a new one?
 - (a) What is the purpose?
 - (b) How was the purpose achieved upto this date? Why this arrangement cannot continue?
8. (a) Is the item complete/component replacement?
(b) Is the replacement due to fair wear and tear? If not, state detailed reasons.
(c) If component replacement
 - (i) What is the cost of the complete equipment/machinery?

(ii) What is the residual life of the old item?

(iii) How is the old item proposed to be used?

9. Was the same item demanded previously, and if so, with what results?

10. For consumable items only:

Stock as on (date)	Dues in if any	Total	Consumption during the past 3 years	Reasons

11. Is the item a service item?

12. If a service item, has demand been placed on the depot concerned?

(a) If so, with what results?

(b) If not, state reasons why procurement from trade is required.

Economic

13. (a) What is the estimated cost of the item? State currency involved.

(b) What is the estimated life of the item?

(c) What is the estimated c.i.f. value of the item?

14. (a) Is the quotation recommended the cheapest one based on competitive quotations received? If not, state reasons.

(b) Accepted quotation is valid upto.....

15. (a) Is the item catered for in the budget estimate submitted by the Estt.?

(b) If so, indicate the financial year in which budgeted.

(c) State page number, serial number and appendix.

(d) If not, state detailed reasons for demanding it now.

Administration

16. (a) Is insurance from warehouse to warehouse required?

(b) If so, state reasons.

17. (a) Is airlift of the item required? If so, state reasons.

(b) Approximate weight of package and cost of airlift.

Certified that:

18. (a) The equipment asked for is complete by itself with accessories or parts which will be available by the time it arrives in India.
- (b) The equipment can be utilised to a substantial capacity (minimum 50 per cent) or is inescapable for pursuit of essential projects.
- (c) All facilities for installation/operation exist and the equipment will be put into operation within 3 months of its receipt in India.
- (d) The item demanded is proprietary item of Messrs....represented in India by Messrs.....and no other make is acceptable (state reasons).
- (e) The item demanded is not available ex-stock with the importing stockists in India.
- (f) (i) The item demanded is not being duplicated in the establishment (if duplicated, state reasons in support of the duplication).
- (ii) Quantity already held is.
- (g) The item is not available with neighbouring R&D Est. (if available state reasons why it cannot be used).
- (h) The cost of the item demanded is within the sanctioned cost of the project (applicable only when item required is for a particular project).
- (i) Clearance from an indigenous angle has been obtained *vide* Director General Technical Development Letter No..... dt.....attached in original. (applicable only in the case of items involving release of foreign exchange including non-convertible rupee exchange).
- (j) This demand caters for all forceable accessories required for functioning of the equipment and no additional demands are anticipated within one year.
- (k) The equipment or its equivalent is not available from Rupee payment Areas *e.g.* East European Countries.

Place.....

Signature.....

Date.....

Designation.....

19. Acceptance of Necessity by Technical Director

Certified that:—

- (a) **Necessity for procurement of the item is accepted.**
- (b) **The item demanded is catered for in the List of equipment approved by EFC.**

OR

It is a new item and hence not covered in the list.

- (c) **The cost is within the ceiling limit approved by EFC.**

DIRECTOR.

APPENDIX XXII

(Vide Para 75)

List of Projects sanctioned to Universities/Research Institutes (upto October 1966)

Sr. No.	Title of the project	Amount sanctioned as on 31-10-1966	Name of the Investigator
1	2	3	4
		Rs.	
1	Optical System Image Evaluation .	33,500	Dr. M. De, University of Calcutta, Calcutta.
2	Studies on Solid/Liquid fuels for rockets.	26,500	Dr. R. P. Rastogi, Uni. of Gorakhpur, Gorakhpur.
3	Studies on technetron and liquid solution transistors.	21,500	Dr. H. P. Agarwal, Maulana Azad College, Bhopal.
4	Attenuation of 3 cm waves by rain and other meteorological conditions in India.	17,200	Dr. S. S. Banerjee, Banaras Hindu Uni. Varanasi.
5	Speech Band Compression . . .	71,400	Dr. J. Das, IIT, Kharagpur.
6	Studies on non-reflecting material at microwave frequencies.	17,000	Dr. Krishnaji, University of Allahabad, Allahabad.
7	Production of Optical cement . . .	33,700	Dr. A. B. Kulkarni, Institute of Science, Bombay.
8	Production of Sponge Iron by Wiberg process.	27,280	Dr. S. K. Dikshit, Banaras Hindu Uni. Varanasi.
9	Investigation on problems of internal Ballistics of guns and rockets.	16,000	Dr. J. N. Kapur, IIT, Kanpur.
10	Development of Millimeter wave techniques and their applications.	28,800	Dr. C. C. K. Murthy, Andhra University, Waltair.
11	Calculation of various properties of gases at high temperatures.	21,800	Dr. S. C. Saxena, Uni. of Rajasthan, Jaipur.
12	Development of Flame resistant and heat resistant polyesters.	60,720	Dr. R. T. Thampy, Shri Ram Institute, Delhi.
13	Application of polyester resin to Naval boats.	10,000	Do.
14	Model Test for small diesel harbour tug.	4,110	C.W. & P.R.S. Poona.

1	2	3	4
15	Design and Development of (a) IF Amplifier—30 Mc Centre frequency and (b) Unit Oscillator 1000—3000 Mc.	Rs. 30,000	Dr. J. N. Bhara, Calcutta.
16	Manufacture of Lactose (Monohydrate)	24,800	Dr. K. K. Iya, National Dairy Research Inst. Karnal.
17	Study of electronic and crystalline structure of metals, alloys and intermetallic compounds.	10,816	Dr. C. Mañde, University of Poona, Poona.
18	Study of chemical constituents of timber resistant to attack of marine borers.	35,400	Dr. A. B. Kulkarni, Inst. of Science, Bombay.
19	Water repellency treatment for apparel fabrics.	28,800	Dr. H. R. Chipalkati, Shri Ram Institute, Delhi.
20	Blast Waves and underwater explosions.	10,600	Prof. P. L. Bhatnagar, Institute of Science, Bangalore.
21	Domain structure of Barium titanate and Zirconates.	27,535	Dr. V. G. Bhide, Inst. of Science, Bombay.
22	Parametric Devices—Amplifiers and mixers using semiconductor diodes.	6,000	Shri K. D. Dikshit, Uni. of Allahabad, Allahabad.
23	Terrain Evaluation of Punjab Plains.	29,740	Dr. Gurdev Singh Uni.
24	Measurement of thermal conductivity of Polyatomic gases, and gas mixtures at high temperatures.	19,500	Dr S. C. Saxena, Uni. of Rajasthan, Jaipur.
25	Bifuel arrangement—an answer to cold starting of diesel engines.	16,600	Prof. B. S. Murthy, Birla Inst. Tech. Ranchi
26	Terrain Evaluation of an area of Vindhyan and Deccan trap formation in Madhya Pradesh	28,520	Dr. W.D. Vest, University Saugar, Saugar.
27	Terrain evaluation of Kamrup District and adjoining areas of Assam.	29,600	Dr. J. M. Chaudhury, Uni. Gauhati, Gauhati.
28	Terrain Evaluation of Madras.	27,975	Dr. N. L. Rao, University Madras, Madras.
29	Ions in Diffusion Flame.	37,400	Dr. T. P. Pandya, University of Lucknow, Lucknow.
30	Research On Human Physiology at high altitudes.	59,320	Dr. R. Vishwanathan, Patel Chest Institute, Delhi.
31	Terrain Evaluation of Lower Himalayas of Garwal.	30,000	Dr. R.L. Singh, BHU, Varanasi.
32	Terrain Evaluation of the area of Visakhapatnam, and Vizianagaram.	29,600	Dr. R. Vaidyanathan, University of Addhra, Waltair.
33	Terrain Evaluation of Punjab Himalayas.	29,660	Dr. Gurdev Singh, Punjab University, Chandigarh.

1	2	3	4
		Rs.	
34	Development of Silicon Brass eventual use by Navy.	20,800	Dr. P. Banerjee, IIT, Kharagpur.
35	Terrain Evaluation of some areas of South Bihar.	29,900	Dr. P. Dayal, University of Patna, Patna.
36	Basic Studies of Jamming of Speech for Electronic counter measures in communication.	19,800	Dr. M. Suryanarayana, University of Osmania, Hyderabad.
37	Sub-surface communication system.	27,100	Dr. Chatterjee, IIT, Kharagpur
38	Synthesis of certain compounds likely to be used as plasticizers and stabilizers of explosives.	10,900	Prof. N. V. Subba Rao, University of Osmania, Hyderabad.
39	Synthesis of improved types of analgesics.	11,600	Dr. B. C. Joshi, Uni. of Allahabad, Allahabad.
40	Development of high stiffness/low weight sandwich structures.	29,800	IIT, Kharagpur.
41	Fibre Forming proteins from oil seed cakes.	23,080	Burdwan University, Burdwan.
42	Terrain Evaluation in the region of Dehra Dun, Mussooree and Uttarkashi.	29,800	Dr. R. S. Mithal, Uni. of Roorkee, Roorkee.
43	Terrain Evaluation contract with Calcutta University (Borders of East Pak., Bhutan, Sikkim and Nepal).	28,800	Prof. S. Sen., University of Calcutta, Calcutta.
44	Viruses associated with acute respiratory infections in adults.	28,200	Dr. R. Vishwanathan, Patel Chest Institute, Delhi.
45	Terrain Evaluation Studies in the Kutch area around Bhuj.	29,720	Prof. S. S. Merh, Baroda University, Baroda.
46	Terrain Evaluation of outer and lower Himalayas of J&K.	29,100	Dr. N. S. Wakhloo, Jammu.
47	Investigation leading to the discovery and development of moulds useful in industrial production of CITRIC Acid by fermentation.	23,400	Dr. B.S. Mehrotra University of Hyderabad, Hyderabad.
48	Development of techniques for testing of optical system.	11,800	Dr. M. De, University College of Tech. Calcutta.
49	Study of Optical system as channel of communication.	21,700	Dr. M. De, University College of Tech. Calcutta.
50	Terrain Evaluation Studies in the central Himalayas—Phase II.	29,900	Dr. R. L. Singh, BHU, Varanasi.

APPENDIX XXIII

(Vide Para 75)

IMMEDIATE

GRANTS-IN-AID FOR DEFENCE RESEARCH

No. 1329/DSO/7708/CG (Admin)

GOVERNMENT OF INDIA

MINISTRY OF DEFENCE

New Delhi, the 4th Sept. 1959

13th Bhadra, 1881

OFFICE MEMORANDUM

SUBJECT:—Grants-in-aid Scheme for Defence Research

The undersigned is directed to say that the Government of India in the Ministry of Defence have formulated a scheme to offer grants for defence research to scientists of standing attached to approved research institutions, universities or college, department or a laboratory attached to a reputed industrial firm. A paper on Grants-in-Aid scheme is forwarded herewith. The Ministry of Education/Ministry of Scientific Research and Cultural Affairs are requested to circulate the scheme to all Indian Universities etc. under intimation to this Ministry.

Sd/SEWA SINGH,

Under Secretary to the Government of India.

To

The Ministry of Education.

The Ministry of Scientific Research & Cultural Affairs.

Copy for information to:—

PS to Defence Minister, PS to DDM (I), PS to DDM (II), PS to the Def. Secy., the Chief of the Army Staff, the Chief of the Naval Staff, The Chief of Air Staff, The Controller General of Defence Production, the Scientific Adviser to the Defence Minister, DGOF, Financial Adviser, Ministry of Finance (Defence), Additional Financial Adviser, Defence Production Organisation, DFA (Prod.), DFA (Navy), DFA (AF), A.F.I.O., Ministry of External Affairs.

ANNEXURE TO O.M. No. 1329/DSO/7708/CG(ADMIN), DATED THE
4TH SEPTEMBER, 1959.

GRANTS-IN-AID SCHEME FOR RESEARCH WORK

In order to utilise the available research facilities in colleges, universities and other research institutes in the country, for defence research, grants-in-aid scheme should be offered to scientists of standing attached to an approved research institution, universities or college department or a laboratory attached to a reputed industrial firm.

2. Purpose of Award

Only projects or schemes of real scientific value and contribution to the defence science would be supported. The R & D Organisation cannot entertain applications for assistance required generally in research laboratory nor will it be able to make personal payments to members of regular staff of universities, colleges and institutions. Grants may be made to enable investigators:—

- (a) to obtain scientific or laboratory assistance. Unless other arrangements are made with the approval of R&D organisation an assistant or assistants must be employed full time on research. The appointments of any assistant under the terms of the grant will be subject to the prior approval of R&D Organisation.
- (b) to purchase special equipment not normally provided by an institution for scientific purpose.

3. Application

Completed forms (Annexure I) of application signed by professor or expert and countersigned by the Head of the institution should if possible reach R&D Organisation on or before 31 Dec/30 June. The head of the institution should state that necessary laboratory facilities would be available to the investigator to carry out his scheme. If need be, the R&D Organisation itself may sponsor a project and invite an expert to take charge of it as investigator. Projects may also be handled by more than one investigator, in which case one of them shall act as principal investigator and also submit a detailed estimate showing how the grant is proposed to be utilised in each half year.

4. Payment of Grant

The grant will be payable half yearly, the investigator must, however, arrange with the universities or college office to receive and make payments on his behalf and also submit a detailed estimate showing how the

grant is proposed to be utilised in each half. The grant will be exclusively utilised for the purpose it is sanctioned and a statement of accounts duly audited by the Auditor of the University/College or Institution shall be rendered every year as on 31st March or on termination of the research if earlier.

5. *Purchase of equipment*

A grant for purchase for expensive equipment is only made when the universities/colleges/institutions cannot PROVIDE for such equipment through its own resources. The University, college or the institution concerned will be responsible for its careful custody. The investigator shall have free and unfettered access to such equipment. The equipment will be the property of R&D Organisation who will be responsible for its future transfer/disposal after the period of research is over. Equipment should be purchased on competitive tender basis.

In accordance with the general practice competitive tenders should be obtained before any purchase is made.

6. *Procedure for grant*

- (a) The Scientific Adviser by himself or on the initiative of R&D Organisation shall decide as to what should form the subject of research for which the aid is proposed.
- (b) Applications invited from scientists of repute or from different institutions interested to take up research work on prescribed from containing the conditions of agreement will then be considered by the Scientific Adviser.
- (c) A statement of case for the proposed Grants-in-Aid will be placed before the "Executive Committee" of the Defence R&D Organisation for according their approval, whereafter the particular institution selected for taking up the research work will be informed of the decision.

7. *Progress Reports*

During the period of grant the investigator is required to submit periodical reports as required in sufficient detail to enable the R&D Organisation to satisfy itself that good use has been made of the grant.

8. *Publication of Results*

The investigator is not expected to publish the results or make any commercial use of the investigations carried on under this aid.

9. *Patent rights*

The result and any inventions or patents arising from the work will be the property of the R&D Organisation, who will have the exclusive

right to decide whether or not the results should be published and/or commercially exploited and if so on what condition.

10. *Access to premises*

The Chief Controller, Chief Scientist or their representatives shall have the right to interest and assess the progress of the work at all stages and for this purpose shall have access to the premises where the work is being carried out.

11. *Termination of Grant*

The R&D Organisation reserves the right of termination of grant at any stage, if convinced that the grant has not been properly utilised or appropriate progress is not being made.

(Complete form should reach R&D Organisation by)

MINISTRY OF DEFENCE

(Research & Development Organisation)

(Application form for grant for research work)

An acknowledgement of this application will be sent to the investigator. R&D Organisation should be informed if an acknowledgement is not received within one month of the application.

SECTION 'A'

Full name of the investigator:

Amount of grant proposed:

Equipment

Contingencies

Staff

Period for which the grant will provide years.

CERTIFICATES

I have read the conditions and I accept them and agree to abide by them if a grant is made. (To be signed by the investigator).

Signature

Date

I certify that this application is made with my full approval and support and I concur with the conditions. (To be signed by the Executive Authority of University/College or Institution).

Grants are usually made in terms of } financial year (1st April—31st } March) and the period should be } stated as one, two, three or more } years as the case may be. }	Signature..... Designation..... Date.....
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SECTION 'B'

1. Name of the investigator.
2. Address of the investigator.
3. Name of the University, College or other institutions at which the investigation is to be carried out.
4. (a) Brief of the project. The Note should be as complete as possible in order to afford the reader a clear perception of the field and importance of the project.
 (b) Full account of the investigation proposed (The description of work contemplated should include the objective of the research and its relation to the present state of knowledge in the field. Reference to the published work on the same subject and plan of research and methods to be used must also be given).
5. If the investigator is on the staff of a University or college give particulars. If not state:—
 - (a) academic record with dates.
 - (b) experience in research and publications.
 - (c) present occupation.
6. Available facilities (Laboratory apparatus and equipment etc.)
7. Will the investigator held any other grant for the investigation, or has application of any such grant been made? If so, give particulars and specify the use proposed to be made of such grant.

8. Estimate of expenditure to be defrayed out of the grant in as much detail as possible. It is intended to purchase an expensive apparatus of a permanent character it should be detailed as follows:—

- (a) Permanent or Capital equipment (Only those which the institution will ordinarily provide but which are specifically needed for work on this project).
- (b) Expendible equipment and supplies (Chemicals, glass-ware, photographic materials, postage and stationary etc.)
- (c) Travel expenses in case of field work, if any.
- (d) *Staff salaries and allowances*: Full particulars must be given and approval of R&D Organisation taken before any ~~assis-~~tant is employed).

APPENDIX XXIV

(Vide para 75)

TRANSACTION OUTSIDE THE CONSOLIDATED FUND OF INDIA

COPY OF O.M. No. F.8(22)-B/65, DATED THE 18TH SEPTEMBER, 1965:
FROM THE MINISTRY OF FINANCE (DEPT. OF ECONOMIC AFFAIRS) TO
ALL MINISTRIES/DEPARTMENTS OF THE GOVT. OF INDIA, ETC.

SUBJECT: *Transactions kept outside the Consolidated Fund of India.*

The undersigned is directed to invite a reference to paragraph 69 of the 35th Report of the Public Accounts Committee (Third Lok Sabha) wherein the Committee have criticised the practice of giving grants to an Organisation set up by Government by resolution or executive order and not having a separate legal status of its own. The Public Accounts Committee have observed in this regard that giving of grants to institutions which have not acquired a legal status is not only irregular but is also fraught with risk in cases of default. The implication is, therefore that either the expenditure of such bodies should be treated as normal Government expenditure and provided for in the budget as such or steps should be taken to secure a separate corporate status for the organisations by getting them registered under the Societies Registration Act etc. Instances of similar grants to bodies without distinct legal entity have been given in paragraph 30 of the Audit Report (Civil), 1965. It may be mentioned in this connection that the general principle of grants-in-aid is that it can be given to a person or a body which is independent of the Government. One department of the Government cannot make a grant-in-aid to another department of the same Government, nor is it permissible to give a grant to an organisation set up by a Government resolution or an executive order, as such an organisation does not have a separate legal entity and can function only as a limb of the Government.

2. The Ministry of Home Affairs, etc. are requested to keep the above principles in view before giving grants to any organisation or institution. Cases in which grants are being given at present to institutions set up by a resolution of Government may also be reviewed and steps may be taken to get them registered under the Societies Registration Act, 1860. Alternatively, the income and expenditure of these organisations should be accounted for as Government receipts and expenditure met from the Consolidated Fund of India. Suitable instructions may also kindly be issued to attached and subordinate offices under intimation to this Ministry.

APPENDIX XXV

(Vide para 77)

COST, PRICE AND NUMBER OF COPIES OF R&D PUBLICATIONS

Name of the Publication	Type of Classification	Frequency	No. of Copies printed	Supplied free of cost	Sold	Sale proceeds	Price
*R&D Abstracts	Secret	Annual	450	415	—	—	unpriced
*R&D Bulletin	Secret	Annual	400	384	—	—	unpriced
*R&D Digest	Open	Bi-monthly	1500	1450	—	—	unpriced
**Defence Science Journal	Open	Quarterly	350	80	215	Accounts maintained by the Govt. Printing Press. Proceeds do not accrue to R & D Orgn.	Rs. 8/- per Yr. for 4 issues of the Journal and 2 issues of its supplement.
†Popular Science Technology	Open	Quarterly	3500	107	1660	1660	Rs. 1/- per issue.

** (Cost of Printing Rs. 20/- per Copy)

† (Cost of Printing—Printed departmentally. No costing has been done but the price of Rs. 1/- per copy has been fixed on an *ad hoc* basis.)

* These publications are not priced.

APPENDIX XXVI*(Vide para 78)***LIST OF SYMPOSIA/SEMINARS ORGANISED DURING
1965-66/1966-67**

Serial No.	Symposia/Seminars/ Conferences	Date	Place
1	Symposium on 'Operational search'	Re- 8-10 Feb. 65	Delhi
2	Symposium on 'Problems on High Altitude'	High 15-20 Feb 65	Poona
3	Symposium on 'Equipment Oriented Design and Development Technology in Defence R&D Orgn.	25-28 Apr 65	Bangalore
4	International Symposium on 'Human Adaptability'	'Hu- Sep 65	Delhi
5	Symposium on 'Managerial aspects of work study'	aspects 7-8 Oct 66	Bombay
6	Symposium on 'Some Aspects of Defence Metallurgy'	13-16 Jan 66	Hyderabad
7	Seminar on 'Nuclear Medicine'	12 Feb 66	Delhi
8	Symposium on 'War injuries with special reference to wounds sustained in the recent Indo-Pak conflicts.'	with 14-19 Feb 66	Poona
9	Symposium on 'Operational Research'	Dec 66	Delhi

APPENDIX XXVII

(Vide para 83)

Appendix for authorised courses of instructions to be conducted at the Institute of Armament Technology Poona

INSTITUTE OF

NOTES.—Originally issued with the Government of India letter No. 89338/RD/Tech/Coord/6858/R/D(R&D) dated the 6th Aug 1964/15th Sravama 1886 (Saka).

S. No.	Name of the Course	Maximum duration	Normal course strength	Maximum frequency of intake	Maximum period of instructional tour to out-stations (a)	Remarks
1	Technical Staff Officers Course	2 years	25	Once a year	6 weeks	
2	Advanced Air Armament Staff Course	27 months	10	Do	7 weeks	
3	Basic Air Armament Course	11 weeks	25	4 courses in a year		
4	Special Weapons Course	48 weeks	12	Once a year	2 weeks	
5	Advanced Electronics Course	36 weeks	12	Once a year	..	
6	Short Science Course	4 weeks	35	Four courses in a year	..	
7	Basic Science and Technology Course for Naval Officers	78 Weeks(c)	15	Once a year	6 weeks	
8	Advanced Technological course for Naval Officers	78 weeks	10	Do	Do	

(a) This period will be included within the overall duration of the courses which will not exceed the limits shown in column 3.

(b) This duration is for G D Officers. It may be cut down to 18 months or even less depending on the merits of individual cases for technical officers holding Engineering degrees or other equivalent qualifications.

(c) Courses of shorter duration may be run in consultation with the Naval HQ if and when they are not in a position to spare officers for full length of courses.

APPENDIX XXVIII

(Vide para 83)

Details of I.A.T. Courses and Eligibility Conditions

Sl No.	Name of Course	Aim	Eligibility	Duration & frequency
1	2	3	4	5
1.	Guided Weapons Introductory Course for Senior Officers.	To give selected Service and Civilian Officers an introduction to the basic techniques, capability, employment and implications of Guided Weapons.	The course will be open to senior officers of the rank of Major General Brigadier and Colonel equivalent of the three Services. Some Civilians connected with development, production and procurement of weapons may also attend this course.	2 weeks—Generally once a year.
2.	Special Guided Weapons course.	To give selected officers of the three Services and Scientists of the Defence Science Service board knowledge of the principles of design and operation of guided weapons with a view to fitting them to : (a) Fill technical appointments connected with guided weapons. (b) Undertake design and development of guided weapons.	The following categories of personnel are eligible to be considered : (a) Graduate in Aeronautical, Mechanical, Electrical and Telecommunication Engineering. (b) M.Sc. in Physics with specialisation in Electronics. (c) Service Officers who have completed the Technical Staff Officers' Course of the Advanced Air Armament Staff Course. (d) Service Officers who have completed the advanced Electronic Course. (e) Service Officers who possess equivalent qualifications.	
3.	Army Technical Staff Course.	To give officers a sound and broad-based basic scientific and Engineering education which would give them an understanding of modern weapons and equipment and	Technical Officers possessing any one of the qualifications given in AI 9/S/62 para 2(c) (i), (f) and (ii) or who have successfully attended the Engineering Signals/EME	18 months for non-technical officer and 12 months for technical graduates—Once a year.

Degree courses at the college of Military Engineering will be selected from among the applicants by a Board, if necessary, without any entrance examination.

their uses. The technical staff officers thus trained would have an understanding of user requirements and problems of research development and production in general terms. They would be able to study the performance of weapons and equipment in the field and report on it so as to assist in further research and development.

Non-technical officers will be selected through an entrance examination followed by an interview, if required.

S.A.O. 18(S)/57 paras 8 to 11 give details of eligibility for recommendation. Officers recommended must be intermediate Science in Physics, Chemistry and Mathematics or its equivalent. Officers who were technical cadets of the Army at NDA are also eligible. All officers should have passed the Promotion Examination Part 'D'.

11 weeks-four times a year.

Regular officers of the rank of Captain and Major will be detailed on the course. Officers must have a minimum of 5 years' service on the date of commencement of the course. Other details are given in AO 202/64.

To educate officers on the effects of science and technology of modern warfare and to enable them to understand the capabilities and limitations of modern weapons and equipment from the users' aspects.

4. Army Scientific Orientation Course

11 weeks—four times a year.

The course is open generally to officers of the non-technical branches of the Navy. Selection will generally be from amongst lieutenants of 2 to 6 years seniority. Minimum educational standard necessary is Intermediate in Science or equivalent.

To give a scientific and technical bias to the thinking of the non-technical Naval officers.

5. Naval Scientific Orientation Course.

6. **Advanced Air Armament Staff Course.**

To give selected officers a thorough grounding in science and technology together with comprehensive training in the application of this knowledge to Air Armament problems. Graduates.

Selection of students will be restricted to :
(a) Permanent Commissioned Officers of the Tech. (Armt.) branch of the Air Force who are engineering graduates from a recognised Indian or Foreign University.

18 months for technical graduates and 27 months for non-technical officers.

7. **Basic Air Armament Course.**

To give to selected officers of the Air Force a broadbased knowledge of the functioning and operation of Air Armament Equipment.

The course is open to General Duties and other officers of the Air Force who do not possess an engineering degree but have an academic standard equivalent to I. Sc., who have 5 to 7 years' service and are not more than 28 years of age.

11 weeks—four times a year.

8. **Senior Apprentice Course (Armament and Electronics).**

To give apprentices a basic knowledge of the Services, Research and Development, Inspection and Production Organisations & to impart instructions in technological reference to Defence equipment and other requirements.

ARMAMENT:

The candidates are required to possess any one of the following depending on the subject of apprenticeship :

(a) At least a good second class M.Sc. degree in Applied Physics with specialisation in Instrumentation or at least second class post graduate diploma in Instrument Technology.

one academic year—once a year.

(b) At least a good second class M.Sc. degree in Organic Chemistry.

(c) At least a good bachelor degree in Civil/Structural/Mechanical Engineering.

(d) At least a good Bachelor's degree in Metallurgy.

ELECTRONICS :

The candidates are required to possess at least a good second class Bachelor's degree in Telecommunication Engineering or M.Sc.

degree in Physics with Wireless/Electronics or equivalent.

NOTE.— The upper age-limit for selection as Senior Apprentice is 27 years for all, including Government servants and departmental candidates and 32 years for candidates belonging to scheduled castes and scheduled tribes.

9. Junior Apprentice Course To give apprentices a broad based knowledge in the various fields of Service Armaments and connected subjects, namely Instrumentation. Metallurgy, Explosives and Engineering knowledge of the Research and Development, Inspection and Production Organisation. The minimum educational qualification prescribed for selection is a good second class 3.Sc. Degree. 3-year Honors Course or second class diploma in Engineering or Technology. The upper age limit is 25 years. One academic year once a year.

(a) Aim of the course will be expected to fill appropriate staff appointments and in addition they will be required to :

- (a) Undertake research and development work in connection with Air Armament.
- (b) fill executive and supervisory posts in Armament Research and Development.
- (c) Represent the views of Air Force in Inter-Service Organisation.
- (d) maintain liaison between Air Staff and Organisation dealing with the development and production of Air Armament Equipment.

(b) Permanent commissioned officers of the Air Force who are not engineering graduates, but who have special aptitude for science and technology and are either ex-NDA cadets or have passed the Intermediate or an equivalent examination of a recognised University with Mathematics, Chemistry and Physics.

(c) Officers of the Defence Science Service nominated by the Scientific Adviser.

APPENDIX XXIX

(Vide para 83)

Capacity and intake of Courses conducted at the Institute of Armament Technology

Name of the Course	Course capacity	Officers attended/ attending
15th Technical Staff Officers Course.	25	29
16th Technical Staff Course	25	14 + 12*
7th Advanced Air Armament Staff Course	10	5
6th Special Weapons Course	12	6
9th Naval Scientific Orientation Course	15	4
No. 7 Army Scientific Orientation Course	30	13
No. 8 Army Scientific Orientation Course	30	15
No. 9 Army Scientific Orientation Course	30	21
No. 10 Army Scientific Orientation Course	30	23
No. 5 Guided Weapons Orientation Course	28	28
No. 2 Introductory Course on Guided Weapons for Senior Officers	15	14
No. 3 Introductory Course on Guided Weapons for Senior officers	15	13
No. 2 Senior Armament Apprentice Course	100	21
No. 2 Senior Electronics Apprentice Course	100	34
No. 2 Junior Armament Apprentice Course	100	46

*12 Technical Officers will join the second phase of this course on 23 Jan, 67.

APPENDIX XXX

(Vide para 8.4)

Statements showing the duration of the Courses, capacity, number of courses conducted and the number of Officers trained during the period 1962—65 in the Institute of Work Study

S. No.	Name of the Course	Duration	Course Capacity	Courses conducted during					Officers trained during				
				1962	1963	1964	1965	1962	1963	1964	1965		
1	Advanced Work Study Course	12 weeks	12	1	3	2	2	17	59	41	33		
2	Basic Work Study Course	3/5	20	3	..	..	..	79				
	Method Study Course (Revised name of Basic Study Course)	5	20		2	2	..		37	45			
	Record Analyst Course (Revised name of Method Study Course)	5	20			..	1		..		20		
	Work Study Assts. Course (Revised name of Recorder Analyst Course)	5	20									..	
3	Work Study Appreciation Course	1	20			2	4		..	43	75		
4	Work Study appreciation Conference	2-3 days	25		..	..	2		..	..	58	
5	Production Planning and Control course	3 weeks	16			1					17		

APPENDIX XXXI

Summary of Conclusions/Recommendations

Sl. No.	Reference to Para No. of Report	Summary of Conclusions/Recommendations
1	2	3
1	4	<p>The Committee are glad to note the steady growth of expenditure on Defence Research and Development over the past 6 years. They would, however, like to emphasise that allocation of funds alone would not give better results; it is also necessary that whatever funds may be provided should be purposefully utilised. Viewed from this angle, the Committee appreciate the decision of the Defence Research and Development Organisation to consolidate the existing achievements before embarking on expansion programme.</p>
2	7	<p>The Committee note that in accordance with the charter, the Defence Research and Development Organisation is expected to carry out applied research only. However in actual practice about 5% of the efforts in the Organisation are devoted to basic research in order to sustain applied research, 35% to applied Research and 60% to development. The Committee suggest that Government might consider the feasibility of amending the charter of duties so as to make the position clear in the matter of basic research.</p>
3	11	<p>The Committee are not happy at the existing composition of the Defence Research and Development Council with a preponderance of non-scientist members and feel that as at present constituted it is not perhaps in a position to fully guide and direct scientific research relating to the defence of the country. The Committee suggest that the Council as the policy making body at the highest level should include at least three eminent independent scientists so as to induct more expertise in the Council and make it more broad based and useful. The Committee are glad to learn that the Defence Research and Development Council is in the process of reorganisation and they hope that this will be done without any delay.</p>

- | I | 2 | 3 |
|---|----|--|
| 4 | 12 | <p>The Committee note that out of 9 members of the Executive Committee of the R & D Council only three, normally, the Scientific Adviser, Chief Controller, Research and Development and Director General, Inspection are members of the Council. Normally, the Executive Committee should be composed of selected members from the larger body i.e. the Council. Since there are as many as six outsiders in the Committee, the present nomenclature "Executive Committee" would appear to be a misnomer. The Committee accordingly suggest that the nomenclature of the "Executive Committee" should be changed so as to remove any confusion in this regard.</p> |
| 5 | 12 | <p>The Committee further note that the membership of the Executive Committee is confined to officers from Army Headquarters and the Ministry of Defence. The Committee suggest that the membership of this Committee should be mainly scientific and should include at least two independent scientists whose presence will be useful to the deliberations of the Executive Committee.</p> |
| 6 | 13 | <p>The Committee consider that for the efficient functioning of the Defence Research and Development Council and Executive Committee, it is essential that they should be provided with suitable secretarial assistance from among the existing staff of the Organisation. They hope that the question of reorganising the present secretarial set-up for the Defence R&D Council and the Executive Committee will be settled without any further delay.</p> |
| 7 | 14 | <p>The Committee are unhappy to note that the Research and Development Council had not been functioning in the manner it was supposed to function and therefore it failed in co-ordinating and directing scientific research relating to the defence of India and the development of or improvement in weapons and material required by the Armed Forces. Instead of dealing with policy matters, determining priorities for Research and Development in defence science, and reviewing the progress of research and development work done by the organisation, it was engaged in the earlier years in discussing minor matters pertaining to administration and procedures. The Committee hope that while the Council is being reorganised, the functions of both the Council and the Executive Committee will be clearly defined and demarcated.</p> |

1	2	3
8	15	<p>The Committee are surprised that instead of meeting once every month as originally envisaged, the Executive Committee of the R&D Council met only 10 times in the course of the last 5 years i.e. even on fewer occasions than the Council. In this connection the Committee would like to point out that if these two bodies had been provided with an efficient and vigilant Secretariat, the position would have been less discouraging. The Committee desire that while re-constituting the Council and Executive Committee, a clear provision should be made regarding frequency of meetings. They need hardly stress the importance of the Council and the Executive Committee meeting regularly in accordance with the time schedule that may be laid down in this respect.</p>
9	20	<p>In para 25 of their 94th Report (Third Lok Sabha the Committee had suggested that the desirability of having a specialist from the private sector industry on the Defence Metallurgical Research Laboratory Advisory Committee might be considered by the Government. The Committee are glad to note that its earlier recommendation of associating a specialist from the private industry with the Advisory Committee has been accepted. They are further glad to note that provision of associating outsiders have been made in the following cases:-</p> <ol style="list-style-type: none"> (1) Defence Metallurgical Research Laboratory Advisory Committee (2) Institute of Nuclear Medicine and Allied Sciences Advisory Committee (3) Defence Science Laboratory, Delhi Advisory Committee (4) Defence Laboratory, Jodhpur Advisory Committee
10	20	<p>The Committee feel that the association of scientists and specialists with the scientific activities of Defence Science Organisation, consistent with the need for keeping secrecy, will be beneficial to the organisation as a whole.</p> <p>The Committee note that the authorised frequency of the meetings for the Panels, Advisory Committees and Boards is rather vague. The Committee feel that if the various Committees and Panels are to serve the purpose for which they are intended, they should</p>

1	2	3
		meet more frequently in future, and the number of meetings to be held has to be specified and adhered to.
11	35	The Committee have noted the organisational set-up and working of the Advisory Groups, namely, the Scientific Advisers to the Chiefs of the Army, Navy and Air Staff and the Scientific Advisers attached to command Headquarters. They feel that with suitable modifications the Scientific Advisers to the Service Chiefs should provide a most useful and strong link between the R&D Organisation and the users (Service Headquarters).
12	36	The Committee do not find any justification for retaining the three Functional Groups as part of the Headquarters when they are stated to be scientific groups like any laboratory or establishment. The Committee also suggest that the feasibility of separating the three Functional Groups (especially the Directorate of Psychological Research) from R & D Headquarters might be examined.
13	39	The Committee feel that there is scope for reducing the number and strength of the Technical Directorates which are mainly concerned with liaison and coordination. They are inclined to think that the number of scientists at the Headquarters should not be large. In so far as the Defence R&D Organisation is concerned, the real work is done at the Establishments/Laboratories and the scientists should be usefully employed there. The Committee would urge that at the time of implementing the decision to introduce the model constitution in the Defence Research Establishments/Laboratories in terms of the Cabinet Secretariat letter of 16th April, 1964, Government will take the opportunity of reorganising the Headquarters set-up with a view to reducing the Directorates to the barest minimum compatible with efficiency.
14	39	The Committee have been informed that the Technical Directors at the Headquarters and the Directors Incharge of Establishments/Laboratories belong to the same cadre and grade and yet while the Technical Director can sanction a project upto Rs. 50,000, the Director can sanction upto Rs. 20,000 only. This in the opinion of the Committee would appear to be an anomalous position and needs to be looked into.

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The Committee also suggest that the Director at the Headquarters and the Directors Incharge of Establishment/Laboratories should be inter-changed after a certain period of time as such a system will add to the experience and efficiency of officers.

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The Committee feel that during the Fourth Plan period greater attention should be paid to strengthen, augment and accelerate defence research and development efforts in areas where a wide gap exists and which require to be filled up to meet the country's urgent defence needs. They, however, would like to stress that the number of establishments/laboratories set up and the magnitude of expenditure should be related to the availability of experienced scientists of whom there are not many and to the capability of these institutes to absorb gainfully the funds placed at their disposal.

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The Committee are unhappy to note the delay in the adoption of the model constitution for R&D establishments and laboratories. They would, however, like that the Governing Councils for the Laboratories are carefully constituted so that they are able to give proper guidance. The Committee hope that introduction of the model constitution in the Establishments/Laboratories of the Defence R&D Organisation will enable them to carry on the work of research and development efficiently and without any administrative delays.

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The Committee realise that it may be difficult for every Defence Research laboratory or establishment to reach the optimum size. Efforts should, however, be directed to limit their expansion because beyond a certain size the principle of diminishing returns acts strongly against the added investment.

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While the Committee accept that the Solid State Physics Division of the National Physical Laboratory and the Solid State Physics Department of the Delhi University are only a small affair as compared to the Solid State Physics Laboratory, they are not much impressed with the achievement of the Solid State Physics Laboratory. They regret that none of the projects have so far reached a production stage. They would like that there is closer coordination and cooperation between this Laboratory, Central Electronics Engineering Research Institute, Pilani, Solid State Physics Division of the National Physical Laboratory and Solid State Physics Department of the

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Delhi University at institutional levels. In this connection the Committee would like to draw attention to the observations made in their 103rd Report (Third Lok Sabha) relating to the National Physical Laboratory, CSIR:—

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

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The Committee have viewed with great concern the circumstances in which the Defence Food Research Laboratory was set up. They are surprised that a laboratory of the CSIR which is maintained by the Government of India should have expressed its inability to undertake the defence work on the plea of being preoccupied. This only shows lack of coordination between the Defence R&D Organisation and the C.S.I.R. The Committee hope that research laboratories under the C.S.I.R. will not in future refuse to undertake research work whenever approached by the defence authorities.

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The Committee would also urge that closer co-ordination is maintained between Defence Food Research Laboratory and Central Food Technological Research Institute and only those problems which are exclusively of defence interest and for which facilities do not exist in the Central Food Technological Research Institute should be undertaken by the Defence Food Research Laboratory. It should be the endeavour of the Government to utilise the research facilities available in the Central Food Technological Research Institute to the maximum possible extent.

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The Committee feel that there is much scope for coordination of research activities especially from the point of view of equipment among the various aeronautical institutions located at Bangalore. The Committee suggest that the Executive Committee of the Research and Development Council should go into the matter.

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- 22 46 The Committee feel that sufficient thought was not given when the Aeronautical Development Establishment was formed and they are unhappy about the achievements of the Establishment. They hope that the Executive Committee would take into consideration the feasibility of merging the Aeronautical Development Establishment with any other organisation doing allied nature of work.
- 23 48 The Committee are distressed to note the casual manner in which the decision to locate the Institute of Work Study at Mussoorie was taken by Government. Lack of proper consideration and planning in the selection of the location of the Institute has resulted in waste of effort and money and dislocation of work. They need hardly point out the necessity for a thorough and careful examination of such matters before reaching a decision. The Committee would urge that in future very careful thought should be given to all aspects before deciding upon the location of a Defence Research Institute or Laboratory. In so far as the Institute is concerned, the Committee suggest that it should be shifted to a suitable new location which is easily accessible both to private industries and defence installations, as soon as possible.
- 24 49 The Committee are not fully convinced with the reasons advanced for shifting major portion of the Defence Research Laboratory (Materials), Kanpur to Gwalior. They realise that there is congestion at Kanpur and sufficient space is not available to meet the needed expansion and development of the Laboratory. Yet the Committee are inclined to feel that Kanpur has a clear locational advantage over Gwalior, being a centre of industrial units and technical institutions and having connected research facilities. They would like to impress upon the Government the desirability of carefully considering all the pros and cons before any Laboratory is shifted from one place to another. In this connection the Committee would like to invite the attention of the Government to a similar observation they have made in para 16 of their 94th Report (Third Lok Sabha) regarding the shifting of the Defence Metallurgical Research Laboratory from Ishapore to Hyderabad in 1963-64.
- 25 50 The Committee do not feel satisfied with the reasons advanced for setting up and locating the Terminal Ballistics Research Laboratory at Chandigarh. On the other hand they are inclined to feel

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that Explosives Research and Development Laboratory at Kirkee could have been suitably expanded to meet the need requirements which necessitated the setting up of the Terminal Ballistics Research Laboratory at Chandigarh.

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The Committee would like to stress that as far as possible, the Research Institutes under the Defence Research and Development Organisation should be located in close proximity to areas where industrial, technical and operational facilities are available.

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In view of the fact that there have been several cases of initial location and subsequent shifting from the place of location of defence research laboratories which resulted in wastage of money, manpower and time, the Committee desire that enquiry should be made so as to ensure that such cases do not recur.

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The Committee note that 'liaison and coordination' is the main function of the R & D Headquarters, That being the case, they feel that the Headquarters Directorates are overstuffed more particularly in regard to officers. In their opinion a small compact Headquarters would better serve the interests of research work assigned to the R & D Organisation. They are, however, glad to note that the staff strength at the R & D Headquarters has been reviewed by the Staff Inspection Unit and, as a result of the recommendations made by the Unit, some reduction has been made both in the Gazetted (Administrative) and in the non-gazetted Establishment.

The Committee have been informed that the Government have agreed to adopt the model constitution as envisaged in the Government of India, Cabinet Secretariat letter No. 84|13|CF-64, dated 16th April, 1964 for major establishments and laboratories in the R & D Organisation. They hope that after the introduction of model constitution in the Establishments and Laboratories and the formation of Governing Councils for them, the workload at the Headquarters will be considerably reduced necessitating a further review of the staff position (both technical and administrative) at the Headquarters.

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The Committee note that the percentage of expenditure on administration to the total recurring expenditure in certain laboratories|establishments exceeds 20% and, in some cases (excluding training estab-

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lishments), it has exceeded 30%. The Committee would stress the need for reducing administrative expenditure which is on the high side.

The Committee also suggest that the Ministry may lay down definite ceilings in regard to the percentage of administrative staff *vis-a-vis* the total staff as also the percentage of expenditure on administrative personnel in each laboratory/establishment. The Committee also suggest that before laying down the ceilings the Ministry may ascertain the position obtaining in CSIR laboratories and similar organisations in the U.K. and other advanced countries. In this connection, the Committee would also like to invite the attention of the Ministry to the observations/recommendations made by them in para 19 of their 95th Report (March 1966) (Third Lok Sabha 1965-66) on the Ministry of Defence: Defence Research and Development Organisation—Electronics and Radar Development Establishment Bangalore.

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The Committee are glad to know that the Director of Laboratory/Establishment has been vested with increased powers in respect of certain items and that the question of vesting powers in respect of other items is still under consideration. The Committee hope that there will be progressive decentralisation of responsibility and delegation of as much authority as possible from the Scientific Adviser to the Technical Directors and to the Directors of Establishments/Laboratories. The Committee would like to urge that the Director of an Establishment/Laboratory should on his part, delegate adequate financial/administrative powers to the Administrative Officer so that he may be relieved of the routine administrative work and may devote greater part of his time to the performance of technical duties.

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The Committee attach great importance to the induction of talented young men into the Defence Science Service. The Committee cannot over-emphasize the importance of giving suitable incentives to the service officers and also ensuring to them adequate career prospects within the organisation. The Committee hope that Government would take an early decision on the question of rationalisation of the scales of pay.

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The Committee note the methods of secondment and permanent retention of service officers in the R & D Organisation. The Committee feel that in view

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of the specialised and technical nature of the work which the Service Officers are expected to perform, selection has to be made very carefully keeping in view the scientific attainment and experience of the officers concerned. The Committee also feel it necessary to associate a representative of the U.P.S.C. with the Defence Research and Development and Production Selection Board before the selection of service officers for permanent retention in the R&D Organisation is made.

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The Committee note that there is now no open unhealthy rivalry between the Service and Civilian Officers. They would, however, stress that utmost vigilance be exercised in the matter and all cases of covert or overt rivalry promptly investigated and necessary remedial action taken so that the work of the Organisation does not suffer. The Committee would like to emphasise that the laboratories and the establishments should be manned by officers—Service or Civil—who are eminently qualified and experienced in the latest developments in the field of science so that an atmosphere could be created in which both service and Civil elements could co-exist and cooperate for the benefit of the Organisation.

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The Committee note that the average time taken from the advertisement of a Defence Science Service post by U.P.S.C. to the appointment of a person from outside is about one year. The Committee consider this time-lag to be rather excessive. The Committee would urge that steps should be taken to reduce the time-lag so that a candidate for a Defence Science Service post could be appointed within a period of six months from the date of the advertisement. The Committee also consider that due to administrative delay the period of seven to eight months taken for the selection of a departmental candidate is also on the high side. This period should also be reduced.

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The Committee are concerned to note the large number of vacancies in the category of Scientific| Technical Officers (Gazetted and non-Gazetted) in the Defence R&D Organisation. They feel that administrative delays involving recruitment of technical hands can be avoided with proper planning at all levels. As regard the availability of technical|scientific personnel, the Committee would like to invite the

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attention of the Ministry to the recommendation contained in Para 32 of their 94th Report on the Ministry of Defence: Defence Research and Development Organisation—Defence Metallurgical Research Laboratory, Hyderabad.

- 36 61 While the Committee realise the difficulties of the R&D Organisation, they nevertheless feel that expansion programmes of the Organisation should be formulated in such a manner that persons in none of the groups remain dissatisfied. The Committee also suggest that the feasibility of introducing a system of time scale promotion and promotion of Senior Scientific Officers may be considered.
- 37 62 The Committee are glad to note the various incentives that are being provided to the Civilian Scientists and to the Service Technologists in the Defence R&D Organisation. They, however, are concerned to note the number of scientists who have resigned their jobs in the Organisation during the last two years. The Committee feel that keeping the staff satisfied plays a great part in the successful running of a research organisation. A research organisation like this should provide adequate incentives to the scientists so that they do not seek their prospects outside the Organisation.
- 38 62 The Committee feel that a Junior Scientist in the Defence Research and Development Organisation needs some encouragement in terms of money but what he will value much more is better facilities, better opportunities for work and better treatment. The Committee suggest that in order to sustain and inspire a young talented scientist, he may be entrusted with independent charge of a certain project so that he can develop self-confidence and initiative.
- 39 64 The Committee note the procedures for the formulation of budget estimates of the Defence Research and Development Organisation. They also note the provision for procurement of stores in India and abroad. The Committee feel concerned that indents to the extent of Rs. 235 lakhs were outstanding with Defence Research and Development Organisation at the beginning of the year (1966) and only indents worth Rs. 149 lakhs were expected to be materialised
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during the course of the year. The Committee cannot too strongly emphasise the need for expediting the purchases which are being effected by the Defence R&D Organisation through the agencies of India Supply Mission, Washington, Director General, Supply and Disposal, and the Ordnance Depots.

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The Committee regret to note the heavy shortfall between the budget allotted and physical targets achieved in respect of R&D Works during 1961-62 and 1964-65; caused by non-materialisation of sanctions, late release of stores etc., slow progress of works and retendering etc. The Committee suggest that the remedial measures taken by Government to avoid the recurrence of these shortfalls should also include realistic budgetary allotment on works projects in addition to plugging the loopholes in the existing procedure of works administration.

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The Committee note with concern that the Fourth Plan proposals of the Defence Research and Development Organisation indicate only the broad areas in which R&D effort will be intensified and do not specify the projects in accordance with their relative significance from the point of view of defence, import substitutions, development of indigenous know-how, etc. The Committee feel that the Planning Commission which is concerned with allocation of resources as also the Defence Research and Development Council which is to apportion the available resources among the different units, should be provided well in advance with such vital statistics as number of projects proposed to be taken up under various Laboratories|Establishments and their significance in national economy, the physical targets the percentage of machinery and equipment that would have to be imported, the extent of import substitution likely to be achieved, etc. so that it could be possible for the planners to examine the programme of each Laboratory|Establishment on a realistic basis in the context of national economy.

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The Committee are glad to note that the procedure for the sanction of foreign exchange has been streamlined. They also note with satisfaction the extent of utilisation of foreign exchange by the R&D Organisation. They would like to stress that where there are inescapable demands, there should be no obstacles in the release of foreign exchange.

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| 43 | 69 | <p>The Committee are glad to note the efforts of the Defence R & D Organisation with regard to import substitution and self-reliance in various fields of defence science and technology. The Committee consider that these efforts need not necessarily be limited within the organisation only. For complete defence preparedness it is necessary to create a sense of participation in the private sector also which may be called upon to meet the defence requirements in case of urgent necessity. The Committee would like to urge that it should be the endeavour of the Organisation to break the dependence on foreign equipment as early as possible.</p> |
| 44 | 72 | <p>The Committee are glad to note the steps taken by Government to obviate delays in the matter of purchase of stores and equipment etc. for the Defence research laboratories. They hope that an early decision will be taken by Government on the question of setting up of a Stores Purchase Committee in the R&D Organisation as recommended by the Estimates Committee in Para 77 of their 94th Report (Third Lok Sabha).</p> |
| 45 | 72 | <p>The Committee would, like to impress upon the Government the necessity of taking immediate steps to avoid delay in installation of equipments already purchased or imported at heavy cost. Delay in installation of a set of instrumentation equipment costing Rs. 11,15,784/- at Terminal Ballistics Research Laboratory is alarming. In para 58 of their 94th Report (Third Lok Sabha) the Committee had occasion to make an observation on the abnormal delay in purchasing and installing the Powder Metallurgy Plant in the Defence Metallurgical Research Laboratory, Hyderabad. They are constrained to observe that this is yet another instance of failure to install the equipment immediately on receipt. They feel that the delay could have been avoided through proper planning and coordination of activities by the Defence R&D Organisation and other agencies concerned. The Committee hope that such cases will not arise in future.</p> |
| 46 | 73 | <p>The Committee are glad to note that there is close liaison between the Defence R&D Organisation and the Council of Scientific and Industrial Research and the resources of the latter are being fully utilised for investigation of problems of strategic importance. The Committee would suggest that directives should</p> |

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be issued to all the R&D Laboratories|Establishments to the effect that before any new project is taken up by them, they should first consult the Defence Co-ordination Unit with a view to ascertain whether work on same or similar problem is being or has been carried out at any of the C.S.I.R. Laboratories.

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The Committee feel that since defence research and development cannot progress, severed from the main current of scientific and technical effort in the country and abroad, active effort must be made at all times to forge and develop closer liaison with the CSIR and other scientific organisations in the country. They recommend that more tasks which can be accomplished by the CSIR and National Laboratories should be given to them and the facilities for research should be utilised to the maximum extent possible. The defence panels and advisory committees should however ensure that the tasks allocated are well defined and specific.

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The Committee commend the steps taken by the Defence R&D Organisation to maintain liaison with Indian Institutes of Technology and Universities. The Committee hope that energetic steps will be taken to enlarge the scope of collaboration with learned bodies like Indian Association for Cultivation of Science, National Institute of Sciences of India, etc.

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The Committee note the arrangements for giving grant-in-aid to the Universities for undertaking research on problems of interest to defence. From the list of projects sanctioned to universities|research Institutes upto October, 1966, the Committee find that no project has been assigned to Bengal Engineering College, Sibpur which is one of the oldest technical institutions in this country. While the Committee appreciate that as per the Government of India Order grant-in-aid can be given only to a person or body which is independent of the Government, they see no reason why an institution should not be approached for undertaking research on specific defence problems without any grant-in-aid. The Committee feel that the Defence R&D Organisation should make a special effort to get the Government Engineering institutions and similar other institutions which have necessary facilities, interested in defence research.

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While the Committee note the efforts made by the Defence Research and Development Organisation in utilising the facilities for research existing in the

universities, they feel that it is necessary to conduct a review of the working of the grant-in-aid scheme which has been in operation for over four years. The Committee suggest that the views of the universities receiving the grants may be obtained and thereafter the procedures and the policies of the entire scheme may be reviewed by a study team in which university people may be associated.

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The Committee are glad to note that Universities are showing increasing interest in the journals brought out by Defence R&D Organisation. They however suggest that not only Universities but also Engineering Colleges and all the important Institutes of Technology in the country should be encouraged to subscribe to these journals with a view to popularise the periodicals among science students so that they know something about defence science and get interested in it. The Committee urge that it should be the endeavour of the R&D Organisation to raise the standard of the contents of their publications so as to merit international recognition. They would also suggest that the information contained in the publications should relate more to what is happening in their own research laboratories than to what is happening outside.

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The Committee consider that holding of only 19 Symposia|Seminars during a period of five years indicates that the medium is not being utilised adequately. The Committee suggest that the symposia on practical problems being dealt with by the Defence R&D Organisation should be organised more frequently and with greater participation of scientists and technologists from outside the Organisation so as to let in the fresh air. The Committee also suggest that summer schools should be held for giving training to the apprentices and trainees at the various training institutes under the Organisation, and for providing opportunities to bring them in contact with senior scientists.

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The Committee realise that participation of Defence Research Laboratories|Establishments in exhibitions does obviously affect the normal R&D work, yet it has to be viewed against the gain from the angle of opportunities that these exhibitions provide for a wider dissemination of information concerning defence effort (including R&D).

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- 54 79 The Committee note that the R&D Conference is an annual feature of the Defence Research and Development Organisation. This enables the Principal Staff Officers, Directors of Field Units and Technical Directors at the Headquarters to take a co-ordinated look once a year at the Defence R&D efforts as a whole to assess how well the Organisation is fulfilling its charter of duties and to discuss measures needed to tackle various organisational and other problems to further the objectives. The Conference provides an occasion for self-introspection. The Committee are glad to note that the discussions held in these conferences are not only free and frank but very useful and stimulating and are bound to lead to fruitful results. The Committee commend the business like manner in which the proceedings are conducted at these Conferences and hope that the Organisation will continue to benefit from such Conferences.
- 55 80 The Committee have noted the efforts made by the Defence R&D Organisation in locating as well as arranging facilities for training of defence scientists. They, however, consider that there is still much scope as well as urgent need for further exploration of training facilities in special important fields like radar, electronics, guided missiles, etc., and they would like to stress the need for taking proper steps in this regard, as speedily as possible.
- 56 82 The Committee have noted that there is no representative from the CSIR on the Advisory Board which advises the Ministry of Defence on matters concerned with the Institute of Armament Technology. The Committee would urge that in the interest of better coordination, CSIR should be represented on this Board.
- 57 83 The Committee are unhappy to note that it has not always been possible for the Services to spare officers with the consequence that the courses had to be made of a shorter duration. The Committee are of the view that shortening of a course would only result in reducing the competence of the trainees and would vitally affect the interests of the defence science and technology. The Committee would like to urge that the question of duration of the courses should be reviewed as early as possible. They would also urge that when a particular course is started it should be ensured that the intake capacity is fully utilised.
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- 58 84 The Committee note with concern that the number of courses conducted by the Institute of Work Study has varied from year to year. Even the intake capacity for the various courses has not been fully utilised. The Committee cannot too strongly stress the need for fuller utilisation of the existing capacity and would suggest that the Ministry may investigate the reasons for shortfall and take remedial action.
- 59 85 The Committee feel that since work study has been accepted as an integral part of defence science, efforts should be made to fully exploit it on proper lines. They would like to recommend that persons who have been trained in work study, should be engaged on similar work wherever they are posted with a view to derive maximum advantage from their training.
- 60 86 The Committee regret to note that since its inception in late 1962, no training courses were conducted at the Fire Service Research, Development and Training Establishment for officers till 1965 mainly because of the inability of the Services to spare their officers. They hope that in future better use of the training facilities existing at the Establishment will be made by the Services. It is regrettable that Services failed to take advantage of the facilities of training during 1962-65.
- 61 87 The Committee are not happy that a separate Fire Research Division is being set up under the CSIR when there is already a well-established Research Organisation under the Ministry of Defence—Defence Research and Development Organisation. The Committee hope that the Fire Research Division of the Central Building Research Institute, Roorkee, will not take up such of the activities as are being performed by the Fire Service Research Development and Training Establishment under the D.R. & D.O. The Committee would like to stress the need for maintaining a close liaison between the two organisations. They also suggest that the scope of augmenting the training facilities at the Fire Service Research Development Training Establishment may be explored so that personnel from Civil Research Institutes as also the Ministry of Home Affairs academic institutions etc. also could be trained there in fire fighting operations.
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62	88	<p>The Committee are unhappy that the Apprenticeship Training Scheme has not been able to attract suitable candidates in adequate numbers and that the intake capacity has remained under-utilised. The Committee feel that poor response is mainly due to unattractive stipends paid to the Apprentices. The Committee suggest that the question of raising the quantum of stipends for the Apprentices be considered by Government so that brilliant and talented research scholars are encouraged to look for their careers in the Defence Research and Development Organisation.</p>
63	89	<p>The Committee would like to reiterate their earlier recommendation made in para 36 of their 95th Report (Third Lok Sabha) stressing the need for periodical evaluation of the research work conducted by the Research and Development Laboratories/ Establishments once every 5 years by a Committee consisting of eminent scientists drawn both from the Defence R&D Organisation as well as from outside. In view of the fast changing developments in the field of science, the Committee would urge that the first such quinquennial evaluation should be done immediately in addition to the usual evaluation made by the Organisation. In addition to the quinquennial review, the Committee would also stress the need for evaluating research at the institutional level in terms of achievements in relation to the objectives set forth and the resources utilised. Such an evaluation is necessary with a view to see whether the investments in terms of resources are commensurate with the possible gains from the results of research.</p>
64	90	<p>The Committee feel that there is too much of stress on the secrecy aspect in Defence Science which is not necessary. The Committee recommend that the question of secrecy and classification in defence scientific research should be examined from time to time with a view to keep it to the barest minimum.</p>

APPENDIX XXXII

Analysis of Recommendations/Conclusions contained in the Report.

I. CLASSIFICATIONS OF RECOMMENDATIONS

A. Recommendations for improving the Organisation and Working:

Serial Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 31, 32, 33, 36, 37, 48, 54 and 64.

B. Recommendations for effecting economy:

Serial Nos. 13, 17, 27, 28, 29, 43, 45, 61 and 63.

II. ANALYSIS OF MORE IMPORTANT RECOMMENDATIONS DIRECTED TOWARDS ECONOMY:

Sl. No.	Sl. No. as per summary of recommendations (Appendix XXXI)	Particulars
1	2	3
1	13	The Committee feel that there is scope for reducing the number and strength of the Technical Directorates which are mainly concerned with liaison and coordination. They are inclined to think that the number of scientists at the Headquarters should not be large. In so far as the Defence R&D Organisation is concerned, the real work is done at the Establishments/Laboratories and the scientists should be usefully employed there. The Committee would urge that at the time of implementing the decision to introduce the model constitution in the Defence Research Establishments/Laboratories in terms of the Cabinet Secretariat letter of 16th April, 1964, Government will take the opportunity of reorganising the Headquarters set-up with a view to reducing the Directorates to the barest minimum compatible with efficiency.

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2	17	<p>The Committee realise that it may be difficult for every Defence Research Laboratory or Establishment to reach the optimum size. Efforts should, however, be directed to limit their expansion because beyond a certain size the principle of diminishing returns acts strongly against the added investment.</p>
3	29	<p>The Committee note that the percentage of expenditure on administration to the total recurring expenditure in certain Laboratories/Establishments exceeds 20 per cent and, in some cases (excluding training Establishments), it has exceeded 30 per cent. The Committee would stress the need for reducing administrative expenditure which is on the high side.</p> <p>The Committee also suggest that the Ministry may lay down definite ceilings in regard to the percentage of administrative staff <i>vis-a-vis</i> the total staff as also the percentage of expenditure on administrative personnel in each Laboratory/Establishment. The Committee also suggest that before laying down the ceilings the Ministry may ascertain the position obtaining in C. S. I. R. laboratories and similar organisations in the U. K. and other advanced countries. In this connection, the Committee would also like to invite the attention of the Ministry to the observations/recommendations made by them in para 19 of their 95th Report (March 1966) (Third Lok Sabha 1965-66) on the Ministry of Defence: Defence Research and Development Organisation—Electronics and Radar Development Establishment, Bangalore.</p>
4	63	<p>The Committee would like to reiterate their earlier recommendation made in para 36 of their 95th Report (Third Lok Sabha) stressing the need for periodical evaluation of the research work conducted by the Research and Development Laboratories/Establishments once every 5 years by a Committee consisting of eminent scientists drawn both from the Defence R&D Organisation as well as from outside. In view of the fast changing developments in the field of science, the Committee would urge that the first such quinquennial evaluation</p>

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should be done immediately in addition to the usual evaluation made by the Organisation. In addition to the quinquennial review, the Committee would also stress the need for evaluating research at the institutional level in terms of achievements in relation to the objectives set forth and the resources utilised. Such an evaluation is necessary with a view to see whether the investments in terms of resources are commensurate with the possible gains from the results of research.

Sl. No.	Name of Agent	Agency No.	Sl. No.	Name of Agent	Agency No.
18.	W. Newman & Company Ltd., 3, Old Court House Street, Calcutta.	44	29.	Oxford Book & Stationery Company, Scindia House, Connaught Place, New Delhi.-1.	68
19.	Firma K. L. Mukhopadhyay, 6/1A, Banchharam Akrur Lane, Calcutta-12.	82	30.	People's Publishing House, Rani Jhansi Road, New Delhi.	75
DELHI					
20.	Jain Book Agency, Connaught Place, New Delhi.	1	31.	The United Book Agency, 48, Amrit Kaur Market, Pahar Ganj, New Delhi.	88
21.	Sat Narain & Sons, 3141, Mohd. Ali Bazar, Mori Gate, Delhi.	3	32.	Hind Book House, 82, Janpath, New Delhi.	95
22.	Atma Ram & Sons, Kashmere Gate, Delhi-6.	9			
23.	J. M. Jaina & Brothers, Mori Gate, Delhi.	11	33.	Book well, 4, Sant Narankari Colony, Kingway Camp, Delhi-9.	95
24.	The Central News Agency, 23/90, Connaught Place, New Delhi.	15		MANIPUR	
25.	The English Book Store, 7-L, Connaught Circus, New Delhi.	20	34.	Shri N. Chaob Singh, News Agent, Ramlal Paul High School Annex, Imphal.	77
26.	Lakshmi Book Store, 42, Municipal Market, Janpath, New Delhi.	23		AGENTS IN FOREIGN COUNTRIES	
27.	Bahree Brothers, 188, Lajpatrai Market, Delhi-6.	27			
28.	Jayana Book Depot, Chapparwala Kuan, Karol Bagh, New Delhi.	66	35.	The Secretary, Establishment Department, The High Commission of India, India House, Aldwych, LONDON, W.C. -2.	

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