



ANNUAL REPORT

1989-90

PAKISTAN SCIENCE FOUNDATION



Pakistan Science Foundation

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PAKISTAN SCIENCE FOUNDATION
Almarkaz F7/2
Islamabad

LETTER OF TRANSMITTAL

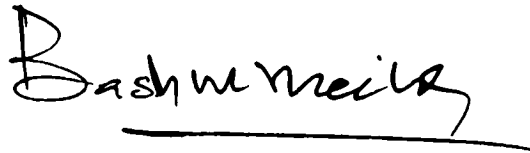
Islamabad

Dear Mr. Secretary

I have the honour to enclose herewith the Annual Report of the Pakistan Science Foundation for the Fiscal year 1989-90, alongwith its audited accounts, as adopted by the Board of Trustees for submission to the National Assembly as required by the Pakistan Science Foundation Act III of 1973.

With regards.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Bashir Ahmed Sheikh", written over a horizontal line.

(Dr. Bashir Ahmed Sheikh)

Chairman

PAKISTAN SCIENCE FOUNDATION

Secretary,
Ministry of Science and Technology,
Government of Pakistan,
ISLAMABAD.

PAKISTAN SCIENCE FOUNDATION

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DR. M. D Shami, M Sc (Chemical Technology) Ph.D. (Inorganic - Analytical Chemistry), Washington State University, (U S A.)

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Dr. Bashir Ahmed Sheikh	Member (Science)
Ch. Zia-ul-Qayyum	Director/Member (Finance)

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1.	Dr. M.D. Shami	Chairman
2.	Dr Bashir Ahmed Sheikh	Member (Science)
3.	Ch. Zia-ul-Qayyum	Director/Member (Finance)

Sixteen part-time Members appointed as follows:

4. Chairman, Pakistan Council for Science & Technology, Islamabad.
5. Dr Naeem Ahmed Khan, House No 9, Street No.11, F-7/2, Islamabad.
6. Lt gen M A Z Mohyidin, House No 16, opposite Apwa College Jail Road, Lahore
7. Dr S Ahmed Hasnain, Director General, National Institute of Electronics, Islamabad.
8. Dr. A Q. Alvi, Chairman, Council for Works & Housing Research, Karachi.
9. Mr. M Masihuddin, Secretary, Ministry of Production, Government of Pakistan, Islamabad.
10. Dr. M. Raziuddin Siddiqui, Fellow, Pakistan Academy of Sciences, Islamabad.
11. Dr. A.Q. Ansari, Chairman, University Grants Commission, Islamabad.
12. Dr. Ishfaq Ahmed, Senior Member, Pakistan Atomic Energy Commission, Islamabad.
13. Dr. M H. Qazi, Vice-Chancellor, Allama Iqbal Open University, Islamabad.
14. Prof. Dr. R A K. Tahirkheli, Director, Centre of Excellence in Geology, University of Peshawar, Peshawar
15. Prof Dr. Jameel Ahmed Khan, Vice Chancellor, NED University of Engineering and Technology, Karachi.
16. Lt. Gen Syed Azhar Ahmad, Executive Director, National Institute of Health, Islamabad
17. Dr. Amir Muhammad, Chairman, Pakistan Agriculture Research Council, Islamabad.
18. Prof. Dr. H A. Kazmi, Whole-Time Member, University Grants Commission, Islamabad.
19. Mr. Abdul Raziq Khan, Secretary, Department of Irrigation and Power, Government of Baluchistan, Quetta

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LIST OF ABBREVIATIONS

Province

B	Baluchistan
C	Centre
F	Frontier
P	Punjab
S	Sind

Sponsoring institutions

AC	Agricultural College
AU	Agricultural University
ED	Engineering University
QU	Quaid-i-Azam University
KU	Karachi University
HG	Government College, Hairpur
PU	Peshawar University/Punjab University
SU	Sind University
KMC	Khyber Medical College
NHL	National Health Laboratories
CSIR	Council of Scientific and Industrial Research
JPMC	Jinnah Post-Graduate Medical Centre
NIAB	Nuclear Institute for Agriculture & Biology

Disciplines

AGR	Agricultural Science
BIO	Biological Sciences
ENG	Engineering Sciences
MED	Medical Sciences
PHY	Physical Sciences
CHEM	Chemical Sciences
MATH	Mathematics & Computer Sciences
EARTH	Earth Sciences
OCEANG	Oceanoigraphy
ENVR	Environmental Sciences

INTRODUCTION

The Pakistan Science Foundation was established on June 30th, 1973 under the Pakistan Science Foundation Act No.III of 1973 (Annexure-I) as an autonomous body to promote and finance scientific and technological activities having a bearing on the socio-economic needs of the country. Under the Act, the Foundation has been entrusted to carry out the following functions -

- a)
 - i) establishment of comprehensive scientific and technological information and dissemination centres.
 - ii) promotion of basic and fundamental research in universities and other institutions on scientific problems relevant to the socio- economic development of the country.
 - iii) utilization of the results of scientific and technological research including pilot plant studies to prove the technical and economic feasibility of processes found to be promising on a laboratory scale;
 - iv) establishment of science centres, clubs museums, herbaria and planetaria;
 - v) promotion of scientific societies, associations and academies engaged in spreading the cause of scientific knowledge in general or in the pursuit of a specific scientific discipline or technology in particular;
 - vi) organisation of periodical-science conferences, symposia and seminars;
 - vii) exchange of visits of scientists and technologists with other countries;
 - viii) grant of awards, prizes and fellowships to individuals engaged in developing processes, products and inventions of consequence to the economy of the country; and
 - ix) special scientific surveys not undertaken by any other organisations and collection of scientific statistics related to the scientific efforts of the country.

- b) The Foundation shall also:-
 - i) review the progress of scientific research sponsored by it and evaluate the results of such research,
 - ii) maintain a National Register of highly qualified and talented scientists/engineers and doctors both in and outside Pakistan, and to assist them in collaboration with concerned agencies to seek appropriate employment; and
 - iii) establish liaison with similar bodies in other countries.

The activities performed under the above mentioned statutory functions are given in the chapters that follow:-

CHAPTER-1

ACTIVITIES & PROGRAMMES

The Activities and Programmes Undertaken by the Foundation for the performance of its statutory functions can be broadly divided into four categories:-

- i) establish comprehensive scientific & technological Information & Dissemination centres.
- ii) Promote & Finance Scientific Research in the country and the utilization of the research results.
- iii) Promote and Popularize Science in Society.
- iv) International Liaison.

The first activity is carried out through Pakistan Scientific and Technological Information Centre, a subsidiary organisation of PSF. The other functions i.e. research support, Science popularization etc. are performed by the Science Section of the Foundation, which is divided into two sub sections as under:-

(A) Research Support Section performing the following activities.

1. Research Support.
 - (a) Grant of Research Projects to individual researchers
 - (b) Institutional Support.
2. Research Evaluation.
3. Scientific Societies/Learned Bodies
4. Exchange of visits.
5. Awards and Fellowships
6. Survey and Statistics
7. Scientists Pool.
8. International Liaison
9. Other Activities

(B) Science Population Section, which carries out the following activities:-

1. Funding for Conferences, Symposia, Seminars, Workshops.
2. Organisation of Science exhibitions/fairs.
3. Popular Science lectures
4. Arranging Film/Plantarium & slide shows.
5. Distribution of Scientific Books & Magazines.
6. Science Promotion through Press & Publications.

7. Science Posters.
8. Promotion of Science in rural areas through Mobile Science exhibition (Science Caravans).
9. Establishment of Science Centres. clubs. etc.

A second subsidiary organisation of Pakistan Science Foundation is the Pakistan Museum of Natural History established in 1979 to serve the national needs in the vitally important areas of research, conservation & education involving Pakistan's heritage of natural resources. The Museum is a national repository for permanent storage of plants, animals, rocks, minerals & fossils of the country.

The progress of the work carried out by the Science Sections of the Foundation, PASTIC & PMNH during the year 1989-90 is summarised in the following pages.

PAKISTAN SCIENCE FOUNDATION.

RESEARCH SUPPORT SECTION.

The progress of the work done by the Research Support Section during the year, 1989-90 under various statutory functions entrusted to it, is submitted below:

1. RESEARCH SUPPORT:

The Promotion of Basic and Fundamental Research in Universities and other Institutions on Scientific Problems Relevant to the Socio- economic Development of the Country.

The Foundation carried out its statutory responsibility for the support of Scientific Research through following programmes:-

- a) Grants for research projects submitted by individuals or groups of Scientists in the Universities & Research Institutions in the country.
- b) Institutional Support - provision of equipment, literature, staff training facilities, etc. to build institutional capability for conducting research.
- c) Support for participation in regional and international research programmes.

A) GRANTS OF RESEARCH PROJECTS SUBMITTED BY INDIVIDUAL RESEARCH WORKERS OR GROUPS OF SCIENTIFIC WORKERS:

Research Support is the principal programme of Foundation for the promotion of basic and fundamental research, having relevance to the socio-economic needs of the country. The details of new projects received and processed for funding by the Foundation is as under:

New Projects:

During the period under report, 29 projects costing Rs.14.575 million were received by the Foundation, whereas 60 projects proposals which had been at various stages of their processing, were carried over from the previous year. Thus, in all, 89 proposals remained under active consideration of the Foundation during the period 1989-90. The proposals were examined by the experts in relevant fields in the light of their scientific merit and according to the criteria laid down by the Foundation. The criteria for research are: (a) competence of the Scientific Personnel to carry out the research; (b) Institutional capability i.e. availability of requisite equipment, library facilities and support from scientific colleagues; (c) Scientific merit of the proposed research, and (d) likelihood of completion of the project within the stipulated time. Each proposal after receipt of the initial review report, is placed before the relevant Technical Committee

for technical evaluation and Executive Committee of the Foundation for final sanction.

During the report period, following thirteen (13) projects were sanctioned at an estimated cost of Rs. 3.136 million:

<u>Title of Schemes:</u>	<u>Name of P.I. & Organisation Supported</u>	<u>Project Cost</u>
<u>Agricultural Sciences:</u>		
A Survey of the Toxigenic Fungi in Agricultural Commodities. P-CSIR/Agr (95)	Dr. F.H. Shah, PCSIR Laboratories Lahore	Rs. 2,56,448/-
<u>Biological Sciences:</u>		
Survey & Determination of Resistance in Mosquitoes and Houseflies of Karachi Region S-KU/Bio (161)	Prof. Dr. S.N. Naqvi Department of Zoology University of Karachi, Karachi.	Rs. 2,42,600/-
Plasmids of Gram Positive Cocci as Tools for Genetic Engineering S-KU/Bio (170)	Dr. Shaikh Ijaz Rasool Department of Microbiology, University of Karachi Karachi	Rs. 13,26,000/-
Studies on the Siwalik Proboscidea & Reptilia P-PU/Bio (173)	Dr. Abu Bakr, Department of Zoology University of Punjab, Lahore	Rs. 61,300/-
Teratogenicity & Embryotoxicity of two Commonly Used Insecticides in Mics. P-PU/Bio (174)	Dr. Shahzad A. Mufti Department of Zoology University of Punjab Lahore	Rs. 2,62,700/-
Production of Medicinally Important Metabolites from Rauwolfia Cell Cultures F-PU/Bio (177)	Dr. Ihsan Ilahi Department of Botany University of Peshawar, Peshawar	Rs. 3,49,500/-
<u>Chemical Sciences:</u>		
Sesquiterpene from Medicinal Plants of Pakistan, F-GU/Chem (108)	Dr. G.A. Miana, Deptt. of Pharmacy, Gomal University, D.I. Khan.	Rs. 1,12,800/-
Application of high performance Liquid Chromatography for Multielemental Analysis at Trace Levels using Ketoamine Schiff Bases S-SU/Chem (172/1)	Dr. M.Y. Khuhawar, Institute of Chemistry, University of Sindh, Jamshoro	Rs. 83,150/-

<u>Title of Schemes:</u>	<u>Name of P.I. & Organisation Supported</u>	<u>Project Cost</u>
Preparation of New O.S N. Donar Ligands for Complexation with Transition Metals C-QU/Chem (195)	Dr. Mrs. Roshan Ahmad, Department of Chemistry, Quaid-i-Azam University, Islamabad.	Rs. 1,21,600/-
Isolation Structure Elucidation & Biological Activity of the Chemical Constituents of some Composite Plants S-KU/Chem (205)	Prof. Dr. Viqar-ud-Din Ahmad H.E.J. Research Institute of Chemistry, University of Karachi, Karachi.	Rs.2,61,262/-
Earth Sciences:		
Mineralization & Petroge-netic Study of Rocks along Indus Suture Zone, C-PMNH/Earth (38)	Mr Shahid Hussain, Earth Sciences Division, Pakistan Museum of Natural History, Islamabad	Rs.3,11,500/-
Environmental Hazards Atlas of Northern Montane, Pakistan. P-PU/Earth (40)	Prof. F.A. Shams, Institute of Geology, University of Punjab, Lahore.	Rs. 2,67,300/-
Engineering Sciences:		
Developing Management Model for Optimum use of Water Resources under System Constraints S-DRIP/Eng (27)	Dr. Bashir Ahmad Chandio Drainage & Reclamation Institute of Pakistan DRIP, Tandojam.	Rs. 1,69,500/-

The 1st installments of above listed projects amounting to Rs. 1.029 million, were released after signing of Contract Agreement with the Sponsoring Institutions. Brief Summaries of these projects are as under:-

P-CSIR/Agr (95)

A Survey of Toxigenic Fungi in Agricultural Commodities

Mycotoxins are fungal metabolites elaborated on Agricultural Commodities by the specific fungi. When ingested, they cause cancer and other fatal diseases in livestock and poultry, which result into low weight gain, reduced egg production, contaminated meat, eggs and milk, deformed off springs. Pakistan being a developing country cannot afford the loss of large quantities of its Agricultural produce.

The project is aimed at investigating the toxigenic strains of fungi responsible for the contamination of Agricultural Commodities and studying the effect of various environmental factors like CO₂, temperature, water activity and relative humidity in the production and enhancement of mycotoxins. Samples of poultry feeds will be collected and screened for the presence of fungal activity at various stages, so as to work out the exact time/place of contamination i.e. in the

field during storage or in market. Methods of detoxification of the contaminated feed will also be studied.

The results of these investigations may help in developing the technology for effective detoxification of the affected agricultural products.

S-KU/Bio (170)

Plasmids of Gram Positive Cocci as Tools for Genetic Engineering

Genetic Engineering depends upon availability of suitable plasmids that can be used as vectors or carriers for transferring the desired gens into the recipient bacteria. Only a few plasmids having a wide host range have been isolated in gram negative bacteria, whereas, the isolation of such plasmids has not met with clear cut success in gram positive cocci bacteria.

The project involves screening of extra-chromosomal elements or plasmids of the gram positive cocci that are involved in human or animal pathogenicity, chemical degradation and bacteriocin production. The plasmids isolated will be characterized for varied properties viz, drug resistance, host range transmissibility etc. by using different recipient strains.

The results of these investigations will help in the procurement of vectors and bacteriocinogenic plasmids for their use in: (a) Genetic engineering experiments and, (b) Successful eradication of phytopathogenic plant bacteria.

P-PU/Bio (173)

Studies on the Siwalik Proboscidea and Reptilia Collected during the Project No.P-PU/Bio (102) and (104)

Survey was carried out to collect and identify the Siwalik Fossil Fauna pertaining to Carnivora, Equids, Bovides and Artiodactyla under PSF Projects, Bio (102) and Bio (101). During the surveys a number of specimens belonging to proboscidean and reptilian class were also collected, which will be identified under this project.

The identification and study of the fossil fauna of the Siwaliks will render it easier to interpret the past history of these animals as well as help in understanding the stratigraphy of the area.

P-PU/Bio (174)

Teratogenicity & Embryotoxicity of two commonly used Insecticides in Mice.

Extensive use of insecticides for obtaining increased crop yield adversely affect many non-target organisms including humans. Following a reduction in the use of chlorinated hydrocarbons, two categories of insecticides i.e organophosphates and carbamates are being used. These insecticides are biodegradable and are thus considered relatively safe for non-target animals. It is well known that although adult animals can tolerate the assault of various chemicals, their fetuses are much more susceptible to even small doses of these chemicals. The effects of these insecticides on mammalian embryos have not been studied to any significant extent.

The Project is aimed at testing the embryotoxic and teratogenic properties of two commonly used insecticides belonging to organophosphorous and carbamate groups in white laboratory mice (*Mus musculus*). After determining on LD₅₀ values, various sublethal doses will be administered orally to pregnant mice and the affected fetuses recovered will be studied morphologically, morphometrically, anatomically and histologically to study the types of abnormalities these insecticides can cause in different embryonic systems.

It is expected that these investigations will provide enough information so as to plan the application of insecticides more judiciously and awareness about their potentiality in causing birth defects in human children.

Production of Medicinally Important Metabolites from Rauwolfia Cell Cultures

Rauwolfia serpentina, a tropical woody plant growing widely in the Indian sub-continent has been reported to possess immense medicinal value and is being used by the Ayurvedic and Unani System of Medicine for the control of Hypertension. Chemically plant material is found to contain alkaloids namely Reserpine, Serpentine and Ajmaline. The *Rauwolfia* plants grown in Pakistan contain only traces of the Reserpine and Serpentine. Efforts to propagate the plant by Tissue Culture technique have revealed that certain cultures can be produced which contain an appreciable amount of the Reserpine alkaloid.

The project envisages large scale production of Reserpine through tissue culture techniques for: (i) Screening (cellulus/suspension) cultures of *Rauwolfia* for indole alkaloids (ii) Searching for a high yielding strain as influenced by various physico-chemical factors and (iii) Acclimatizing the regenerated high yielding plants for our local conditions.

The metabolites and the whole plant matter will be chemically identified at the H.E.J., Research Institute of Chemistry, Karachi.

The positive results of these investigations might lead to the recommendation of cultivating this plant species on a large scale as an active source of Reserpine

F-GU/Chem (108)

Sesquiterpene Lactones from Medicinal Plants of Pakistan

The plants of family Compositae are a rich source of sesquiterpene lactones. A well known compound santonin (sesquiterpene lactone) reported from various *Artemisia* species is being used in medicine as anthelminthic compound. Moreover sesquiterpene lactones are of intense research interest in view of their significant anti tumor, insecticidal and antimalarial activity. However different species of family Compositae have not so far been systematically investigated for their sesquiterpene content and particularly its tumor inhibiting properties.

The project aims at screening various species of Compositae family for the presence of sesquiterpene lactone and their structural and pharmacological studies. The crude extracts as well as the isolated compounds of these plants will be sent to the National Cancer Institute, USA for testing of anti cancer activity, if any. The investigation's are likely to yield new and novel Sesquiterpenes which may have some medicinally useful properties and thus economic value.

S-KU/Bio (161)

Survey and Determination of Resistance in Mosquitoes and Houseflies of Karachi Region.

Indiscriminate and continuous use of Pesticides results in the development of resistance against these chemicals. As already reported, hundreds of species and strains of insects have developed resistance against various groups of pesticides including organochlorine, organophosphates, carbamates and pyrethroids.

The project aims at investigating the level of resistance in the mosquitoes and houseflies of the Karachi Region, and evaluating the efficiency of chemical compounds namely; Azadirachtin, Juliflorin, Neem extracts etc., for their possible use as insecticides by using RIA, calorimetric and electrophoretic analysis. The data thus obtained will be computerised so as to develop the simulation models which will help in estimating the rate and degree of the resistance in the insect genotypes of the area surveyed

The studies will help in evaluating the present situation of the pesticide resistance in mosquitoes and houseflies of Karachi City and suggesting alternate, cheap and less hazardous methods for their control.

Application of HighPerformance Liquid Chromatography for Multielemental Analysis at Trace Levels Using Ketoamine Schiff Bases

The project is an extension of the PSF supported Research Project S- SU/Chem (172) under the same title wherein Copper and Nickel complexes of Ketoamine Schiff bases, derived from flourorinated B.diketones and lactones and non flourinated B. diketones isovalerylacetone acetylbiivenyl, were prepared and separated on normal and reversed phase HPLC.

During extension period, the flouro substituted ligands and their metal complexes will be prepared and examined quantitatively at normal and reversed HPLC. The results would be compared with corresponding non flourinated ligands to examine the effects of substitution on the elusion and separation of metal for the possible quantitative determinations at trace levels.

The study would lead to the development of new analytical methods for the simultaneous determination of metal ions and would provide basic knowledge about the behaviour and elusion of metal complexes on HPLC and GLC

C-QU/Chem (195)

Preparation of New O.S.N-Donor Ligands for Complexation with Transition Metals.

Metal chelation is involved in a number of important biological reactions where coordination can occur between a variety of metal ions and a wide range of ligands. Many types of the ligands are known and the properties of chelate derivatives have been investigated, still there is a need for the synthesis of new ligands of special and practicable properties.

The project envisages preparation of phenolic ligands and partially thiated B triketones and their metal complexes.

A successful synthesis of these ligands will prove the validity of the methods used for their preparation.

S-KU/Chem (205)

Isolation, Structure Elucidation and Biological Activity of the Chemical Constituents of some Composite Plants.

Majority of rural population of Pakistan still depends on indigenous system of medicine for the cure of various human and veterinary ailments. The scientific screening of metabolites and constituents of these herb needs to be done so as to establish their medicinal value

The project is proposed to carry out investigations on the chemical constituents of some composite plants of Pakistan that are famous for their medicinal value. Initially, six plants namely, Amberboa ramosa, Blumea obliqua, B. lacera, Eclipta prostrata, Inula grantioides and Pluchea arguta have been selected for chemical screening

Structures of the chemical constituents isolated from these plants will be determined through various spectroscopic and chemical studies and will be tested for antibacterial, antifungal and pesticidal activity. Biologically active and non-toxic compounds isolated, if any, from these herbs will have the potential of being used in the field of pharmacy.

C-PMNH/Earth (38)

Mineralization and Petrogenetic Study of Rocks Along the Indus Suture Zone

Different petrotectonic models have been proposed for the rocks exposed in Swat, Dir, Chitral and Northern Areas of Pakistan, Presence of Melange zones along Indian and Eurasian plate margins have been determined very

recently. Discovery of a number of metallic and non-metallic minerals along Southern Suture zone, developed along Indian plate, has opened great avenues for further development of this vital sector.

The project aims at carrying out petrogenetic and petrotectonic studies of the areas in Malakand, Mohamand Bajaur Agencies, Swat and Kohistan Area. Petrographic, chemical and spectro chemical analysis will be carried out to support the field data which would help in understanding the behaviour of plates and rocks of the suture zone in relation to mineralization and solving the problems relating to the structural model of the area and history of the tectonic evolution. The study may also lead to the discovery of new mineral deposits which would ultimately contribute a lot for the socio-economic uplift of the area.

P-PU/Earth (10)

Environmental Hazards Atlas of Northern Areas of Pakistan K.K.H. Between Mansehra Khunjrab & possible Remedial Measures.

More than 60% territory of Pakistan comprises mountaineous regions ranging from 300 m.hill-tops to lofty peaks above 7000 meters. The latter abound in Karakorum mountain range which constitutes the main watershed area of Pakistan. High precipitation and frequent earthquake activity combined with dynamic conditions of these mountains make hill slopes unstable and result in land debris slides, glacier outbursts, flash floods which not only disrupt transport and communication systems but also cause tremendous damage to life and property. Moreover, the excessive sediments discharged into rivers fill up the water reservoirs and shorten their productive life.

The project aims at identifying major zones and documenting the location of natural hazards, their historical behaviour, intensities and possible future recurrence.

The results of these investigations will lead to the preparation of an Environmental Hazards Atlas which may help in the regional planning for suitable remedial measures to minimize damages from such hazards.

S-DRIP/Engg (27)

Developing Management Model for Optimum use of Water Resources Under System Constraints.

In countries where irrigation water is highly valuable due to its scarcity more efficient irrigation and management practices, new and improved technologies such as drip irrigation are being studied extensively so as to achieve higher application efficiency at lower cost

The project aims at developing improved irrigation techniques and integrated water management strategy for the optimum use of the available on-farm water resources. Cost benefit analysis of some case studies of irrigation, drainage and water management projects shall be determined to derive production function. Small scale physical models shall also be constructed to calibrate the research models with large scale projects for proper simulation.

If the suggested models for improving water management practices turn out to be feasible, they will certainly help alleviating water logging and salinity problems and increasing the crop production on existing irrigated lands.

B) INSTITUTIONAL SUPPORT

Grants totaling to Rs. 0.166 million were released to the following institutions for the purposes mentioned against each:

Name of Institutions

Pakistan Museum of Natural History (PMNH), Islamabad.

Promotion of Scientific activities.

Rs. 1,00,000/-

Pakistan Scientific and Technological Information Centre, (PASTIC), Islamabad.

Installation of FAX Machine

Rs.35,000/-

Science Caravan Project, PSF, Islamabad

Building Rent of NWFP Unit, Peshawar.

Rs. 31,000/-

2. RESEARCH EVALUATION:

The Technical/Fiscal Reports received during the report period were evaluated as per procedure laid down by the Foundation for reviewing the progress of PSF Supported Research Projects. The details of these projects are as under:-

A) ON-GOING PROJECTS:

a) Semi-Annual Reports:

Thirty (30) semi annual reports, received after the initiation of each project or after the submission of the annual reports, were scrutinized by the Research Support Section to assess the interim progress of these projects and to release their next due instalments. The particulars of these reports are as under:-

<u>Project No.</u>	<u>Project Title</u>	<u>Reports</u>
S-AU/Agr (90)	Pathogen free potato plants generated from Meristem-Tip Cultures.	1st Semi-Annual
S-KU/Agr (91)	Studies on Resistance in Egg Plant (<i>Solanum melongena</i>) and influence of salinity on infectivity & development of <i>M. javanica</i> .	2nd Semi Annual
P-GC/Agr (92)	Determination of contamination of foods by pathogenic Micro organisms.	1st Semi Annual
C-PMNH/Bio (150)	Ecological studies of mushrooms and toadstools of Kaghan valley.	1st Semi Annual
P-PU/Bio (153)	Studies on the Stability of Hybrid plasmids carrying segments of <i>Bacillus Subtilis</i> in <i>E. coli</i>	2nd Semi Annual
C-PMNH/Bio (156)	Taxonomy & biology of Entomostraca of Northern Punjab.	3rd Semi Annual
C-PMNH/Bio (118)	Ecological studies on the vegetation of Swat.	1st Semi Annual

<u>Project No.</u>	<u>Project Title</u>	<u>Reports</u>
P-CSIR/Chem (171)	Biosynthesis of antibiotic Bacitracin by <i>Bacillus licheni formis</i> as supplement in poultry feed	3rd Semi Annual
S-KU/Chem (173)	Preservation of food by edible plant extracts.	3rd Semi Annual
S-KU/Chem (171)	Physico-chemical studies on the structure of pure liquids and solutions & Co-relation with concentration & Temperature changes thereof	1st Semi Annual
B-BU/Chem (162)	Chemistry and biochemistry of Glycoprotein sulfotransferases and sulfate acceptors	3rd Semi Annual
B-BU/Chem (178)	Immobilization of Enzymes and their application in "Flow Injection Analysis" for the determination of substrates of diagnostic importance.	3rd Semi Annual
B-BU/Chem (179)	Studies on the metabolism of folates and tetrahydrobiopterin in the mammalian system.	2nd Semi Annual
S-KU/Chem (182)	Investigation of pharmacologically active substance from marine flora and fauna.	2nd Semi Annual
S-SU/Chem (181)	Production of Mycelial protein from cellulosic Biomass as substrate for poultry feed.	1st Semi Annual
S-KU/Chem (186)	Pharmacological studies of the constituents of medicinal plants of Cardiovascular importance.	2nd Semi Annual
B-BU/Chem (187)	Kinetic study of the Reaction of Hexa-cyanoferrate (II) with Haloamine in aqueous medium.	1st Semi Annual
C-PMNH/Earth (30)	Mineralogy & Geochemistry of the cambrian formations in Salt Range.	3rd Semi Annual

<u>Project No.</u>	<u>Project Title</u>	<u>Reports</u>
P-PU/Earth (32)	Stratigraphic analysis of Mesozoic and Paleogene Rocks of Hazara, Azad Kashmir and adjacent areas of Rawalpindi & Islamabad.	3rd Semi Annual
AJK/Earth (33)	Petrology and geochemistry of Punjab volcanics in Poonch, Muzaffarabad and Kaghan Valley.	2nd Semi Annual
P-PU/Earth(37)	Petrotectonic element & tectonic framework of North-West Himalya.	3rd Semi Annual
C-OU/Maths(16)	The Pseudo-Newtonian Formalism	1st Semi Annual
S-KU/Phys(51)	Electronic spectra of Molecules.	3rd Semi Annual
P-PU/Phys(52)	Laboratory preparation & study of properties of Binary and Ternary semi-conducting compounds	1st Semi Annual
C-QU/Phys(51)	Atomic photoabsorption spectroscopy	3rd Semi Annual
C-QU/Phys(57)	Quark aspects of Nuclear Physics	3rd Semi Annual
C-QU/Phys(58)	Preparation and study of the high Tc super conductors	1st Semi Annual
P-PU/Phys(60)	The chou-Yang model for high Energy scattering and its comparison with OSD for large momentum transfer	1st Semi Annual
C-QU/Phys(62)	Non-linear optical effects in Atoms in a cavity	1st Semi Annual
C-QU/Phys(61)	Theoretical/Experimental/Computational study of some aspects of Plasma/Fusion Physics.	1st Semi Annual

b) Annual Reports:

As many as twenty seven(27) First Annual & fifteen (15) Second Annual in respect of following on-going projects were received by the Foundation, during the report period:

i) Ist Annual Reports:

<u>Project No</u>	<u>Project Title</u>
S-AU/Agr(90)	Pathogen free potato plants regenerated from meristem tip cultures.
P-BZU/Agr(93)	Improvement of salt tolerance in some important pulse crops.
P-PU/Bio(153)	Studies on stability of hybrid plasmids carrying segments of <i>Bacillus Subtilis</i> in <i>E coli</i> .
P-BZU/Bio(151)	Ecological guidelines for exploitation of natural resources in Thal & Cholistan Sand Dunes.
P-GC/Bio(156)	Taxonomy and biology of Entomostraca of Northern Punjab.
S-KU/Bio(166)	Screening and Isolation of metal resistant bacteria to be used for environmental pollution
S-KU/Bio(167)	A guide to Melacostraca of the Northern Arabian Sea
B-BU/Chem(162)	Chemistry and Biochemistry of Glycoprotein Sulfotransferases and Sulphate acceptors.
C-QU/Chem(167)	Kinetics and adsorption of catalytic processes.
S-Su/Chem(172)	Application of high Performance liquid Chromatography for multielemental analysis Ketoamine schiff bases
S-KU/Chem(173)	Preservation of food by edible plant extracts
B-BU/Chem(178)	Immobilization of enzymes and their application in "Flow Injection Analysis" for the determination of substrates of diagnostic importance
B-BU/Chem(179)	Studies on the metabolism of folates and tetra-hydrobiopterin in mammalian system.
S-KU/Chem(182)	Investigation of Pharmacologically active substances from marine flora and fauna.
S-KU/Chem(185)	Synthetic and biological studies on Pedrin.
S-KU/Chem(186)	Pharmacological studies of constituents of medicinal plants of cardiovascular importance.
B-BU/Chem(187)	Kinetic study of the reaction of Hexa-cyanoferrate-II with Haloamine schiff bases in aqueous medium.

<u>Project No</u>	<u>Project Title</u>
S-AKU/Chem(191)	Multiforms of Dihydrofolate Reductase.
AJK/Earth(30)	Patrology and Geochemistry of Punjab Volconics in Poonch, Muzaffarabad and Kaghan Valley
P-PU/Earth(37)	Petrotectonic Framework of North-west Himalya.
P-PU/Egg(24)	Conservation of electricity in the field of air-conditioning.
C-QU/Maths(16)	The Pseudo Newtonian Formalism.
S-KU/Phys(51)	Electronic spectra of Molecules.
C-QU/Phys(54)	Atomic Photoabsorption Spectroscopy.
P-BZU/Phys(55)	Characterization of semi-conductor lasers.
C-QU/Phys(57)	Quark Aspects of Nuclear Physics.

ii) Second Annual Reports:

<u>Project No</u>	<u>Project Title</u>
P-PU/Bio(153)	Studies on the stability of hybrid plasmids carring segments of Bacillus subtilus in E.coli.
P-GC/Bio(156)	Taxonomy and Biology of Entomostraca. Northern Punjab.
B-BU/Chem(162)	Chemistry and biochemistry of glycorptein sulfotransferases and sulphate acceptors.
S-SU/Chem(172)	Application of high performance liquid chromatography for multielemental analysis at trace levels using Ketoamine Schiff Bases
S-KU/Chem(173)	Preservation of food by edible plants extracts
S-Su/Chem(178)	Immobilization of enzymes and their applications in Flow Injection Analysis', for the determination of substrates of diagnostic importance.
S-KU/Chem(182)	Investigation of pharmacologically active substances from marine flora and fauna.
S-KU/Chem(186)	Pharmacological studies of the constituents of medicinal plants of cardiovascular importance.
C-PMNH/Earth (30)	Mineralogy and geochemistry of the Cambrian Formations in salt range.
P-PU/Earth(32)	Stratigraphic analysis of Mesozoic and Paleogene Rocks of Hazara, Azad Kashmir and Adjacent areas of Rawalpindi & Islamabad and variation in Kohat Potwar Province of Indus Basin.

<u>Project No</u>	<u>Project Title</u>
P-PU/Earth(37)	Petrotectonic elements and tectonic framework of North-West Himalya.
C-QU/Phys(54)	Atomic Photoabsorption Spectroscopy at high resolution.
C-QU/Phys(57)	Quark Aspects of Nuclear Physics

After preliminary Scrutiny by the staff of Research Support Section, the above reports were sent for detailed evaluation to the subject experts in the relevant fields. The progress reports alongwith the evaluation reports were then submitted to respective Technical Committees for consideration and acceptance. The remarks of the Technical Committee, if any, were conveyed to the Principal Investigators of the projects.

Grants Released for On-Going Research Projects

Research grants totaling to Rs. 2 915 million were released on account of various instalments in respects of the on-going projects mentioned in subpara (i) & (ii) above, after technical evaluation.

B. COMPLETED PROJECTS:

Seventeen (17) Final Reports in respect of the completed research projects received during the year, were sent to the subject experts for review and evaluation. Subsequently, these reports alongwith reviewer's comments were submitted to the relevant Technical Committee for consideration and adoption

<u>Project No</u>	<u>Project Title</u>
P-PU;Agr (81)	Effects of Aflotoxins in Poultry.
P-URT/Agr (89)	Studies on adopted Reclamation Practices in Pindi-Bhattian.
S-KU/Agr (91)	Studies on Resistance in eggplant (<i>Solanum melongena</i>) and influence of salinity on infectivity and development of <i>M javanica</i>
C-Qu/Bio(125)	Study of Epididymel function in the Rhesus monkey (<i>Macaca multta</i>) Androgen Development Proteins, their Characterization and regional distribution.
P-PU/Bio (136)	Pest status, feeding preference and control of Termites of Pakistan.
S-AU/Bio (152)	Quantitative Survey of Population Trends of <i>Heliothis armigera</i> and its natural enemies on various, plants of Hyderabad Districts.
C-Qu/Chem (54)	Preparation and study of Medicinal Compounds.
F-PU/Chem (153)	A thermodynamic study of the supermolecular order in aqueous solution of Polyvinyl alcohol.
S-KU/Chem (165)	Isolation and structural studies on the chemical constituents of <i>Ervatamia coronaria</i>
C-QU/Chem (177)	Studies on the chemical constituents of some labiate plants of Pakistan.

Project No	Project Title
P-PMI/Med (86)	Modified Trabedulectomy.
B-BU/Med (93)	Biochemistry of normal, asthmatic, and bronchitic lung mucus.
P-PGMI/Med (109)	Sodium transport in erythrocytes of patients with treated and untreated essential hypertension.
C-NIH/Med (110)	Mother Infant transmission of hepatitis B-Virus in Pakistan.
S-JPMC/Med (114)	Acquired Immune Deficiency Syndrome (AIDS) Seroepidemiology and Surveillance
C-QU/Phys (19)	Coherence Properties of Radiation in Non-Linear optics and Lasers.
C-QU/Phys (50)	Computer simulation of Lasers Fusion/some aspects of Plasma Physics.

Brief summaries of the final research reports listed above are given below:

Project No. P-PU/Agr (81)

Project Title Effects of Aflatoxin in Poultry

Project Particulars:

- Duration. 3-Years + 3-Months extension
- Date of Commencement: 1.7.1985
- Date of Completion: 1.10.1988
- Location of Scheme: College of Veterinary Sciences, Lahore.
- Principal Investigator: Mr. S. Atta-ur-Rehman Rizvi.
- Total expenditure Rs. 1,36,891/-

Main Objectives: To find out the toxin contents of different commercial poultry feeds and the effects of Aflatoxins in poultry under our environmental conditions.

Summary of the Work Done.

Aflatoxins are common contaminants of food grains and agro- industrial by-products stored under faulty conditions. Recently, its presence has been indicated in the poultry feeds. Aflatoxin contaminated foods are toxic, carcinogenic and Immuno Sero- Suppressive in almost all species of animals, man and poultry. Human being may be exposed to the danger of these toxins by eating contaminated food or meat and milk of animals eating contaminated feeds.

The project was undertaken to study the extent of contaminations and effects of varying doses of aflatoxin ingestion. A total number of 300 samples of finished commercial poultry feeds obtained from poultry feed mills, wholesale poultry dealers and poultry farms were analysed for the presence of aflatoxins and it was found that 126 (40%) samples were contaminated with aflatoxins. As regards the quantity of the toxin in positive samples, it ranged from 20 microgram/kg to 2000 microgram/kg. Majority of the highly contaminated samples came from commercial poultry farms and were always accompanied with complaints of high mortalities among stocks and production problems in breeder flocks

Efforts for the experimental production of aflatoxins of various substrates revealed that long grain rice is a convenient substrate with a maximum yield of 803 micrograms aflatoxin/g rice when incubated at 28C in high humidity. Also variable doses of aflatoxins were administered to the chicks and their LD 50 values calculated. As regards the pathological effects of the toxins on the animals, and the effect of aging on this phenomenon, varying doses of the aflatoxins administered to the subjects showed that susceptibility of chicks to aflatoxins and mortality rate decreases with the increase in the age

Studies were also conducted on the effects of aflatoxins on certain Physical and Biochemical parameters; Immune System, egg production and carcinogenicity; food consumption, weight gain and feed conservation ratio and its residues in the animal tissues.

The results of these investigations would help in understanding the disease syndrome produced by aflatoxins and formulating recommendations to minimize the economic loss

Project No

P-UET/Agr (89)

Project Title:

Studies on Adopted Reclamation Practices in Pindi Bhattian.

Project Particulars:

- Duration.	2-Years
- Date of Commencement	1 08 1987
- Date of Completion:	31 07.1989
- Location of Scheme:	University of Engineering and Technology, Lahore.
- Principal Investigator:	Dr M I. Lone
- Total expenditure	Rs. 2,00,090/-

Main Objectives:

- i) Nature and extent of soil reclamation.
- ii) Physico chemical improvements of the developed cultureable waste land
- iii) Cost benefit ratio of different practices envisaged in the Project.
- iv) Detailed water quality survey of 50 tube wells Installed by PLUA and its effect on soil chemical properties.
- v) Extent of development of culturable waste land for crop productions.
- vi) Effects of fertilizer application containing micronutrients on crop yields.

Summary of the Work Done:

The Punjab Land Utilization Authority (PLUA) undertook the development of cultureable wast lands of Punjab and, so far, has completed many projects in various areas, including: Pindi Bhattian, Kot Khan, Kot Isa Shah, Sulemanke, Bahawalnagar Border belt, Norowal. Dera Afghana Border Belt with Pindi Bhattian Distt: Gujranwala.

The major work carried out in the Pindi Bhattian project related to the installation of tubewells for irrigation purposes and providing some technical know-how to the farmers through fertilizer and gypsum application trials and other advisory services.

The evaluation study regarding the quality of water, role of gypsum application in soil reclamation and determining the micronutrients status of soil crops in Pindi Bhattian area has revealed that 5- years after the installation, some of the tubewells are pumping high bicar-bonates water which would lead to damaging the soil in few years. The soil survey and soil reclamation trials carried out at different sites in the project areas have also indicated that gypsum can be utilized as effective amendment for reclaiming the Saline- Sodic Soils of the project area. Further more, analysis of the soil and plant samples (rice, wheat) for micronutrients including copper, Iron and maganese indicated that soils are difficient in the available Zinc. This Zinc difficiency affects the rice yield negatively

The above investigation have led to the conclusion that the installation of tubewells in the Pindi Bhattian areas has substantially benefited the farming community. Besides the development of cultureable wasteland and increase in crop acreage and yields, there has been an increase in the live stock and ultimately milk production. For long lasting beneficial effects, it has been recommended that , (a) the high bicarbonate tubewells water should only be used after it is ammended with gypsum; (b) Zinc should be used alongwith the micronutrient fertilizers to make up its deficiency in the soils of the area, (c) Flood irrigation system should be replaced by trickle irrigation system on coarse textured soils which will save the irrigation water and (d) Gypsum fertilizers and other technology should be provided to the farmers on easy payment system

Project No	S-KU/Agr(91)
Project Title	Studies on Resistance in egg-plant (<i>Solanum melogena</i>) and Influence of Salinity on infectivity and development of <i>M. javanica</i>

Project Particulars:

- Duration.	Two Years
- Date of Commencement	16 01.1988
- Date of Completion.	15 01.1990
- Implementing Agency	University of Karachi, Karachi.
- Name of Principal Investigators.	Dr. M. A. Maqbool
- Total expenditure	Rs.1.95,073/-

Main Objectives.

To screen the local nematode resistant variations of egg plant and potato through root explant culture
To study the influence of salt concentration on development and effectivity of *M. javanica* on tomato through tissue culture technique.

Summary of the Work Done:

Root Knot nematode *Meloidogyne* of Cyst nematode *Heterodera* species are the major parasitic problems leading to reduction in crop yield

Studies were carried out on the culturing of *Meloidogyne javanica* & *Heterodera* zae to screen out resistance in different varieties of brinjal and corn. Five cultivars of brinjal, 13 cultivars of corn and composite 15 were evaluated for resistance of *M. javanica* on brinjal in vitro and *Heterodera* zae on corn in green house. Almost all the brinjal cultivars tested were found susceptible to *M. javanica* infection with varying degrees of infection but even Multan selection was found partially resistant. All the corn cultivars used to screen resistance against corn cyst nematode *Heterodera* zae under green house condition were found susceptible at varying degrees to H, zae. Studies showed that *Heterodera*

zeae required 18- 20 days to complete its life cycle from second stage juvenile to second stage juvenile on susceptible corn cultivars under field conditions. Influence of different concentrations of NaCl, CaCl₂·2H₂O alone and in combination were studied on the hatchability and in vitro infectivity of *Meloidogyne javanica* juveniles on tomato and was found to be inversely proportional to the salt concentration.

These studies have provided basic information on the infectivity of these pathogenic nematodes on their respective host cultivars which could help in further investigation for the development of effective control measures.

Project No.	C-QU/Bio (125)
Project Title.	Study of Epididymal Function in the Rhesus monkey (<i>Macaca mulatta</i>) androgen dependent protein, their characterization and regional distribution.

Project Particulars:

- Duration	One year
- Date of Commencement.	1.09.1984
- Date of Completion.	31.09.1985
- Location of Scheme	Department of Biology, Quaid-i-Azam University, Islamabad.
- Principal Investigator	Dr. Azra Khanum

Main Objectives: To study the androgen dependent sperm maturation process in the Epididymus of Rhesus monkey

Summary of the Work Done:

Androgen dependent proteins have been characterized in a few mammalian species like mouse, rat, sheep, rabbit and hamster, Available evidence suggests that an alternation in the surface change of the sperm takes place during the passage through the epididymis, which has been attributed to an acquisition of glycoprotein on the sperm plasma membrane. It has also been demonstrated that this acidic epididymal glycoprotein (ABG) is secreted by principal cells in the epididymis where functional maturation is known to occur.

The project was undertaken to characterize and study the regional distribution of androgen dependent specific epididymal protein in the rhesus monkey. *Macaca mulatta*. The experimental animals, according to their physiological status, were categorized into three groups namely: (a) intact (b) castrated and (c) castrated and then treated with Testosterone. The protein pattern in the soluble fraction of the epididymal cystosol was studied by polyacrylamide gel, electrophoresis and Isoelectric focusing

The results of these studies have indicated that there are at least five distinct protein components that are synthesized in the monkey epididymis under androgen stimulus, castration for one month resulted in the disappearance of two of these protein bands and a marked reduction in the colour intensity of the other three components. Testosterone treatment (10 mg testosterone propionate daily for 6-days) restored the normal pattern of all the five epididymal proteins. As regards their regional distribution, electrophoretic analysis of various regions of the epididymis showed that four protein components were uniformly distributed in the Caput, Corpus and Cauda regions of the tube, while the fifth one was found specifically associated with the caudal region only. The molecular weight and the Isoelectric points of these proteins were found to vary between 15,000/- to 61,000/- daltons and 5.6 to 6.4 respectively.

Project No P-PU/Bio (136)
Project Title Pest status, feeding Performances and Control of Termites of Pakistan.

Project Particulars

- Duration 3 years
- Date of Commencement 1 7 1986
- Date of Completion 31.6.1989
- Location of Scheme Department of Zoology, University of the Punjab, Lahore.
- Principal Investigator. Dr. Mohammad Saeed Akhtar
- Total expenditure. Rs.3,53,991/-

Main Objectives

To collect information on the (i) extent of damage caused by termites to structural wood and major agricultural crops and (ii) termite species involved, and their control

Summary of the Work Done:

Termites cause sever damage to the agricultural crops and structural wood thereby effecting the economy of the country Although termite fauna of Pakistan have been fairly well explored, yet, little information is available about the status of termite pest species, their mode of attack, environmental and physiological factors affecting the termite behaviour etc

A survey of the wheat, cotton and sugar-cane fields of Punjab was carried out under this project to study the feeding behaviour of termite pests attacking these crops The results achieved are as under -

1. Wheat crop is attacked mainly by the fungus growing termites which attach the plant from seedling to the harvesting stage Mature plants are more susceptible to attack as compared with seedling and younger shoots.

2. Seedling of the cotton crops are attacked by *Odontotermes guptai*, *O. obesus*, *Microuotermes mycophagus*, *M. obesi*, *M. unicolor*, *Eromotermes paradoxals* and *A. dehreansis*

3. In canal irrigated wheat fields, the population density of termites is directly proportional to the atmospheric temperature and relative humidity In the rain fed areas, they are inversly proportional to each other

4. As regard control studies, repellency tests with Lorsban Heptachlor, Dieldrin and Tenekil revealed, that Lorsban and Heptachlor were repellent at all concentrations tested, whereas Dieldrin behaved as repellent at 100 ppm only and not at lower concentration Tenekil was not repellent at any tested concentration Efficacy of insecticides in field tests was also studied Soil was treated with 1% of Lorsban and Tenekil at rate of 140 ml per 200 cm² area Lorsban was found more effective in protecting wood than Tenekil during 30 months observations.

Although termites damage the cotton crop at all stages of growth but younger plants are more susceptible to the attack.

Project No. S-AU/Bio (152)
Project Title. Quantitive Survey of Population trends of *Heliothis armigera* H.b and its natural enemies on Various plants in Hyderabad District.

Project Particulars:

- Duration. 1 year
- Date of Commencement: 01 09.1988
- Date of Completion 31 08 1989

- Location of Scheme Department of Entomology, Sindh Agricultural University, Tandojam.
- Principal Investigator: Dr. Mohammad Lohar

Main Objectives: To survey the insect pest of Legume/pulse crops and identify its natural enemies.

Summary of the Work Done:

Cutworms belonging to the Family Noctuidae, order Lepidoptera have become major insect pests on many field crops root crops and vegetable crops in Pakistan. Among other cutworms, three Heliiothis species i.e. H. armigera, H. assulta and H. peltiyera occur frequently in many parts of the country H. armigera commonly known as gram pod borer, is the most harmful pest of the pulse crops.

Survey of the host plants of Heliiothis armigera was carried out in four Talukas of Hyderabad District namely: Hyderabad, Tando Allahyar, Tando Mohammad Khan and Hala. It was observed that H. armigera occurs mainly on gram, Tomato, Bersean. Soybean, Sunflower, Safflower, Maize, Cotton Peas, Spinach, Brinjal Crops.

The results achieved are tabulated as under:

<u>Crop</u>	<u>Investigation Period</u>	<u>Parts Affected by the Pest</u>
Gram	December - March	Tender Foliage, Flower buds, Flowers, and Seeds.
Tomato	January - April	Leaves, Stem, Flower & Fruit.
Maize	December - March	Tender cobs, upper part of stem and whorls of leave.
Barseen	March	Young leaves stem seeds & flower heads.
Cotton	July - August	Leaves, Tender Shorts, Flower squares and Cotton Balls.
Sunflower	November - Jan	Leaves, Flower heads & Seeds
Safflower,	February - April	Leaves, tender shoots and seeds capsules.
Soybean	May - July	Leaves and green pods.
Potato	October - Jan.	Leaves
Spinach	Jan - March	Young leaves
Peas	December - March	Leaves, Flower & Seed pods
Brinjal.	April - June	Young leaves and fruit.

Maximum number of H armigera moths were trapped during March, April October and November indicating the completion of 4-generations of moths in one year.

Two species of parasitoids Compoletis chlorideae and Apanteles sp. were recorded as larval parasitoids of H armigera. The highest percentage of parasitism was recorded for C chlorideae as 13% for the larvae of H. armigera on the crop

Project No C-IU/Chem (54)
 Project Title Preparation of new Medicinal Compounds by Structure Modificatation and Metal Chelation of Certain Existing Medicinal Compounds and their study

Project Particulars

- Duration. 3-years
- Date of Commencement 1.9. 1976
- Date of Completion 31.5 1979

- Location of Scheme.
- Principal Investigator.
- Total expenditure cost.

Department of Chemistry, Quaid-i-Azam University, Islamabad.
 Dr. Christy Munir
 Rs.1,70,712/-

Main Objectives

- To undertake.
- Preparation of new medicinal compounds by certain modifications in the structure of sulphaguanidine.
- Synthesis of S-Flour-uracil (a human anticancer drug) with metal ions such as platinum, palladium and Cobalt.

Summary of the Work Done

Chemical research in the field of Medicine is nowadays directed towards the synthesis and isolation of new drugs. Researchers at the sametime are also engaged in the structural modification of the existing drugs so as to change their pharmacological properties. By structural modification one can, not only synthesize new drugs but can also introduce desired properties in it. Several new drugs including sulfanilimide and substituted phenanthroline have been synthesized by using this principal and have produced fruit-ful results.

The project was undertaken to synthesize some new medicinal compounds by modifying the structures of Ampiciline and Sulphaguanidine and to study pharmacological activity of the modified compounds. Structural modifications were carried out by substitution and by chelation method in Ampiciline and Sulphaguanidine respectively.

Metal complexes of Ampiciline with Cobalt (II), Iron (III) and Palladium (II) were synthesized and their structures, physical and pharmacological properties were studied in detail. The pharmacological assay of the newly synthesized Ampiciline - Cobalt (II) Complex $\text{Co}(\text{ampicillin})_2(\text{OH})_2 \cdot \text{C}_{12}\text{H}_{20}\text{N}_2\text{O}_6 \cdot 3\text{H}_2\text{O}$ showed that it is 2-3 times more active than Ampicillin against *Salmonella. arizona*, *Proteus vulgaris*, *Staphy locus pyogenens* and *Klebsiella pneumonic* and inactive against *Enterobactor agrogenes*, while the Iron - Ampicillin complex was found inactive against these microorganisms.

Attempts were also made to make structure modification in Sulphaguanidine via replacement of its phenyl group with groups like - CH_2 - or - $(\text{CH}_2)_2$ and to study the changes in the pharmacological activity of the compounds but due to some technical difficulties and limited facilities the desired synthestic results were not achieved.

Project No	F-PU/Chem (153)
Project Title:	A Thermodynamic Study of the Supermolecular Order in Aquous Solutions of Polyvinyl Alcohol.

Project Particulars

Duration	3 Years
Date of Commencement.	1 3.1986
Date of Completion.	28.2.1989
Location of Scheme.	Centre of Excellence in Physical Chemistry, University of Peshawar.
Principal Investigator	Dr. Noor Ahmad
Total sanctioned cost.	Rs.2,85,500/-

Main Objectives

To determine changes in the ratio of gyration and turbidity of aquous PVA solution and their molecular weight by light scattering studies for obtaining the information about the kinetics of SMD formation.

To carry out viscosity measurements of aquous PVA solution as a function of temperature further information about the mechanism of SMD formation.

Summary of the Work Done

The solution properties of Polyvinyl alcohol (PVA) are known to act as aggregating agents for the stabilization of the soil. Furthermore, aqueous solutions are used in the formation of paper treatment and textile. Owing to its vast agricultural and industrial importance, interest in the solution properties is continuously increasing.

The project was carried out to study the formation of the super molecular structure in the aqueous polyvinyl Alcohol (PVA) solution by viscometric and light scattering methods. The PVA polymer was subjected to these studies at various temperatures and in different solvents to find the supermolecular formation and the determination of thermodynamic parameters, second virial co-efficients, molecular weight and the unperturbed dimensions of the PVA polymer.

The viscosity studies were divided into two groups i.e normal viscosity studies and the shear viscosity studies. The normal viscosity studies were undertaken by using ostwald viscometer, while the shear viscosity was measured by using roto viscometer. From these viscosity studies it was found that the 20% propyl alcohol behaves as good solvent, while it is a poor solvent for PVA.

Further orientation and coiling of polymer molecule was observed to be more in water and in aqueous dioxane as compared to aqueous propyl alcohol solvent. The values of heat and entropy of activation of viscous flow increased with concentrations but no generalization can be made due to its irregular pattern at various temperatures. The values of heat and entropy of activation show that solutions of the polymer in 20% propyl alcohol have order whereas, in water they have low order.

The light scattering studies were also undertaken for the PVA water system for un-known molecular weight sample. From these studies, specific refractive index increment, molecular weight, second virial coefficient, etc. were determined.

The results of these investigations will help the researchers in determining various parameters required for understanding the factors that influence the molecular association of Super Molecular Order (SMO) formation at ambient conditions.

Project No.	S-KU/Chem (165)
Project Title.	Isolation and structural studies on the chemical constituents of <i>Ervatamia coronaria</i> .

Project Particulars

- Duration.	3 years
- Date of Commencement.	3 01 1986
- Date of Completion.	31.12 1988
- Location of Scheme.	H.E.J. Research Institute of Chemistry, University of Karachi.
- Principal investigator.	Dr. Atta-ur-Rehman

Main Objectives

- a) Isolation of unknown natural products and determination of their structure by chemical and spectroscopic means.
- b) Evaluation of pharmacological activity both in the Institute and by interaction with Laboratories in Pakistan and abroad.

Summary of the Work Done:

Ervatamia coronaria, is widely distributed in tropical countries as a garden plant. Various parts of the plants are used in the indigenous system of medicine for the treatment of ophthalmia, wounds and inflammation, etc. A number of indole alkaloids have been obtained from the leaves, stem, bark and roots of plants.

The structures of these alkaloids were elucidated using standard spectroscopic analysis, mass fragmentation and H.NMR spectral analysis.

The pharmacological screening of the newly isolated idole bases will help in establishing the medicinal value of the plant.

Project No. C-QU/Chem (177)
Project Title. Studies on the Chemical Constituents of some Labiatae Plants of Pakistan.

Project Particulars

- Duration. 2 Years
- Date of Commencement. 1.2.1987
- Date of Completion. 31 1.1989
- Location of Scheme. Department of Chemistry, Quaid-i-Azam University, Islamabad.
- Principal Investigator. Dr Mashooda Hassan
- Total sanctioned cost. Rs.2,66,800/-

Main Objectives

Isolation, structural studies and biological testing of the chemical constituents of some plant species belonging to the genera Salvia, Teucrium and Leuces (Family Labiatae)

Summary of the Work Done

Different species of plants belonging to the family Labiatae are well known for their medicinal properties and are used in curative preparations. Many of these plants have been subjected to chemical investigation and a large number of active organic compounds with useful pharmacological activities have been isolated and their structures were determined.

The project deal with the isolation, structure elucidation and biological testing of pure chemical constituents of two species namely, Teucrium royleanum and T stocksianum belonging to Labiatae family

Acetone extracts of aerial parts of the plants were subjected to various chromatographic techniques for the separation and purification of different components Six pure compounds were isolated from T. stocksianum. They include acetyl derivative of oleanolic acid, a 1,4-disubstituted benzene derivative with hydrocarbon type of side chains, saturated straight chain hydrocarbon corresponding to molecular formula C₃₉H₈₀, two diterpenes C₁₉H₂₂O₅ and C₂₀H₂₄O₅ and 5, 22-stigmastadien-3-ol. Four pure compounds and eight components were isolated from T. royleanum. They include: pentatriacontanone, hentriacontadien-1-ol, Z12-nonadecen-9 5,23- stigmastadie n-3-o-galctoside (18) mixture of triacontane, hentriacontane and pentatriacontane, mixture of tetracosylester and its higher homologues mixture of octylester and its higher homologues, mixture of triterpenses, mixture of 5,22,25- stigmastatrien-3-ol and 5,25-stigmastadien-3-ol mixture of octadecanoic acid and octadecadeienoic acid methylesters, mixture of hexacosanoic acid and octadesadeienoic acid methylesters, mixture of hexacosanoic acid its higher homologues Characterization and structure elucidation of all the isolated components was done with the help of ¹H, C-13 NMR and mass-spectral studies.

Project No. P-PMR/Med (86)
Project Title. Modified Trabeculectomy

Project Particulars

- Duration 2 years
- Date of Commencement. 1.6.1983

Date of Completion.	31.5.1985
Location of Scheme.	Postgraduate Medical Institute, Lahore.
Principal Investigator.	Dr Nazir Ahmad Malik.
Total sanctioned cost.	Rs.80,840/-

Main Objectives

To evaluate the best method of chronic simple glaucoma surgery between the traditional Trabeculectomy and modified Trabeculectomy.

Summary of the Work Done:

Glaucoma is the second major cause of blindness in the world which is caused by raised intraocular pressure in the eye thereby damaging the optic nerve fibers. If the intraocular pressure is not controlled medically then glaucoma surgery is the only remedy left for the restoration of eye sight. Modified Trabeculectomy is one of the recent treatment of simple glaucoma which involves some modifications and changes in the traditional method of the eye surgery.

The project was undertaken to evaluate the efficiency of the modified trabeculectomy method for the chronic simple glaucoma surgery by comparing it with the traditional method of trabeculectomy.

216 cases of chronic simple glaucoma were included in the study Half of the patients were kept as control and were operated by the Traditional Trabeculectomy in which a piece of half thickness scleral flap of 5mm, by 8mm is dissected and lifted back to cornea. The deeper part is then dissected 1 mm from the cornea, 1 mm piece from sclera and 1 mm of the limbal part vertically with a breadth of 2mm The remaining 108 patients were operated by modified Trabeculectomy in which instead of removing the second flap with knife and scissors, it is trephined 2 mm size. The first flap is then sutured back in its original place after abscising a piece of the Trabecular tissue. In addition to the routine tests, the visual acuity, optic disc change, visual field changes and Intraocular tension of the patients were recorded at regular intervals.

The results showed that in case of patients operated by modified Trabeculectomy, the vision of 11 patients improved while in the control group, only in 4 cases, there was an improvement in the vision. This clearly indicates that modified Trabeculectomy's results are more encouraging as compared to the traditional one.

Project No.	B-BU/Med (93)
Project Title.	Biochemistry of Normal asthmatic and Bronchitic Lung Mucus.

Project Particulars

- Duration	3 years - 8-months extension
- Date of Commencement	1.8.1983
- Date of Completion	31.3.1987
- Location of Scheme	Institute of Chemistry, University of Baluchistan, Quetta.
- Principal Investigator.	Dr Nasir-ud-Din.
- Total sanctioned cost	Rs.6,01,587/-

Main Objectives

To isolate purify and characterize the chemical structure of carbohydrate portion of glycoproteins and role of cystein in normal, asthmatic and bronchitic lung mucus.

Summary of the Work Done:

Normal human bronchial secretion has not so far been investigated and, therefore, bronchial disorders like chronic bronchitis, asthma, and cystic fibrosis which are the diseases caused by the hyper- secretion of mucus, are

difficult to control and regulate. The project was undertaken to (i) isolate, purify, and characterize the structure of the carbohydrate portion of the mucus glycoproteins, (ii) identify variations in the chemical structure of normal and disease related glycoproteins; and (iii) determine the role of cysteine in the gel formation of normal and diseased secretion

The separation of bronchial glycoprotein from the remaining polymeric materials i.e protein and lipids was readily accomplished by gel filtration on Bio-Gel P-200 and was treated with Pronase to remove any contaminating proteins and glycoproteins. Fractionation of Pronase treated glycoprotein on Sepharse 4B resulted in two fractions. The main fraction in ion exchange chromatography resulted in a single high molecular weight component. Despite the fact that glycoproteins are known to be degraded by Pronase, a high molecular weight (1×10^5 to 1×10^6) glycoprotein homogeneous, albeit polydisperse, in agarose electrophoresis and free of contaminating proteins was obtained. Sialic acid in the glycoprotein was present as N-acetylneuraminic acid, which is similar to human mucus and different from bovine which contains N-glyconlyneuraminic acid. Like bovine mucus, the glycoprotein was free of cyteine containing cross- linked protein fraction. Alkaline-borohydride treatment of the glycoprotein resulted in a mixture of oligoscaccharide alditols that were fractionated on Bio-Gel P-6 and further purified by ion- exchange and paper chromatography affording five neutral oligosaccharides. The oligosaccharides structures, characterized can be divided into three groups on the basis of the core structures:

- i) GalB (1 3) Gal - NAc-ol
- ii) GlcNAcB (1 3) Gal - NAc-ol
- iii) HlcNacB (1 6) Gal - Nac-ol

In conclusion, it appears that the biosynthesis of oligosaccharides occurs in core structures. The glycoproteins obtained from the normal bronchial secretion was isolated in very small quantity and a large number of secretions from different secretor types were combined the heterogeneity observed in the carbohydrate chains peraps, arises due to mixing of secretions. A variety of carbohydrate chain blood groups active glycoproteins is known, and the heterogeneity of bronchial mucus glycoproteins could be even wider. These investigations have detailed the structure of neutral oligoscycarides component of the mucin glycoprotein and thereby have provided basis to evolve a meaningful relation between the structure and function of the mucin glycoproteins present in the normal bronchial secretion.

Project No.	P-PMI/Med (109)
Project Title.	Sodium Transport in Erythrocytes of Patients with Treated and Untreated Essential Hypertension

Project Particulars

- Duration.	1 year
- Date of Commencement	1.12.1986
- Date of Completion.	30.11.1987
- Location of Scheme.	Postgraduate Medical Institute, Lahore.
-Principal Investigator.	Dr. Shahnaz Javed Khan
- Total sanctioned cost.	Rs.69,200/-

Main Objectives

To see if $\text{Na}^+ - \text{K}^+$ (Sodium Potassium) cotransport activity in red cell membrane is defective in essential hypertension both before and after treatment.

To see if it can be useful genetic market for susceptibility to essential hypertension.

Summary of the Work Done:

Essential hypertension results from a combination of genetic and environmental factors, most important of which is excess of sodium intake. In patients with essential hypertension and some of their descendents, the sodium-potassium cotransport system which works for the extrusion of intracellular sodium, erythrocytes is found to be functionally deficient and abnormalities are found in erythrocytes membrane.

The project was undertaken with a view to search for any defect in sodium potassium cotransport activity in the erythrocytes cell membrane in essential hypertension and possible usefulness of this cotransport activity as a genetic marker for susceptibility to essential hypertension. Subjects included in this study were categorized into three sub groups namely (i) Hypertensive group without any medical treatment (ii) Hypertensive group including patients who have received some kind of treatment and (iii) Normotensive group including individuals with positive family history of hypertension. All the parameters studied for these groups were compared with control group which included normotensive subjects without a family history of hypertension.

The first part of the study involved measuring the net sodium and potassium fluxes after sodium loading of the erythrocytes in the presence of PCMBS. Membrane sodium transport was then studied in patients with untreated hypertension as well as in treated and normal individuals with a family history of hypertension.

The observed changes in membrane transport were less pronounced than in patients with essential hypertension. In the group of hypertensive patients whose blood pressure had been controlled with medication, the abnormalities in membrane sodium transport, which were noted in patients with untreated essential hypertension, were not present. This suggests that treatment of hypertension reverses the underlying changes in membrane transport.

In addition, the sodium potassium co-transport system and effect of treatment of hypertension on this component of sodium efflux were studied and following conclusion were drawn

- There is a decreased sodium - potassium cotransport activity in untreated essential hypertensive patients which becomes normal when the hypertension is controlled by medication. However, it could not be confirmed whether this abnormality in hypertension is involved in its pathogenesis or not.
- The defective sodium potassium cotransport was not found in normotensive offsprings of hypertensive parents showing that genetic factors may be important but are not exclusive determinants of the sodium potassium cotransport.
- The sodium - potassium flux ratio is decreased in untreated essential hypertension and remains so, although to a lesser degree, even after hypertension has been controlled by medication for at least one month. This shows that the cellular defect in sodium/potassium flux ratio required longer duration for correction.

Project No	C-NIH/Med (110)
Project Title	Mother Infant Transmission of Hepatitis B.Virus in Pakistan.

Project Particulars

- Duration	3 years
- Date of Commencement	1 01 1986
- Date of Completion	31 12 1988
- Location of Scheme	National Institute of Health, Islamabad.
- Principal Investigator.	Dr. Abdul Ghafoor
- Total sanctioned cost.	Rs.2,31,000/-

Main Objectives

To determine the prevalence of Hepatitis B-Virus carriage in mothers and the rate of transmission from these mothers to their newborn infants.

Summary of the Work Done:

Vertical transmission of hepatitis B from carrier mothers to their infants occurs very early in life and leads to chronic carrier state. Carrier infants may gradually develop hepatitis as they grow up, ultimately 25-30% of such children may die of primary liver cancer often with underlying cirrhosis. HBsAg carrier rate in infancy plays an important role in HBV-epidemiology in maintaining a reservoir of the virus in community.

The present study was undertaken to determine the prevalence of hepatitis B in women of child bearing age and the rate of transmission of HBV from carrier mothers to their infants.

A total of 6,225 expectant mothers were screened for HBsAg out of which 1% were found positive. 150 such mother/infant pairs were studied. The delivered infants right from birth up till 18-months of age had complete follow up. Out of 50 HBeAg positive mothers 40(80%) transmitted (non infectious anti-HBe) to the infant. At the end of follow up 2.5% developed anti-HBs and the rest had lost the maternal antibodies.

In 150 mother/infant control pairs, 75 had anti-HBs. They transmitted anti-HBs to 67% of the new borns and at the end 13.0% developed anti-HBs. Out of 75 HBV negative control group mothers, 3.7% had HBeAg in cord blood and at the end they developed anti-HBs. The rest of infants were negative for HBV. During the study period 10 children under 5-years of age were referred with HBsAg positive. Their contacts were studied for HBV markers. In all the cases either of the parents were positive for HBsAg and HBeAg. These investigations have concluded that

- Transplacental transmission of HBV is one of the causes of Hepatitis B in infants. About 4% children born to HBsAg and HBeAg mothers carry the virus and develop the disease.
- Infants born to HBeAg positive mothers are at a great risk of acquiring hepatitis B. Such children must get vaccination as early as possible.
- Passively transmitted anti-HBe in infants confers protection until the immune system of the infants start producing antibodies (6-12 months against hepatitis B).
- Hepatitis B in children under 5 years of age appears to be contact associated.
- In cases found positive HBsAg with liver disease, either of the parents were found positive for HBeAg and HBsAg. As children are more close to mothers, the risk of infection increases if the mother is HBeAg positive. Such children may be protected by immunization against hepatitis B.

Project No.	S-JPMC/Med (114)
Project Title	Acquired Immune Deficiency Syndrome (AIDS) Seroepidemiology Surveillance

Project Particulars

- Duration.	1 year
- Date of Commencement	1 01 1987
- Date of Completion.	31.12.1987
- Location of Scheme	Jinnah Postgraduate Medical Centre, Karachi.
- Principal Investigator	Dr Amtul Hafeez
- Total sanctioned cost	Rs.60,000/-

Main Objectives

To assess AID risk in Pakistani population and to obtain data for its Surveillance and preparation of recommendations for screening of blood donors.

Summary of the Work Done:

AIDS, the global epidemic disease characterized by severe Immune deficiency state, has been reported from 140 countries since 1981 and the number of people infected with Human Immune Deficiency Virus (HIV) is more than ten million. A seroepidemiological study was conducted to find out indications of HIV infection, if any, in Pakistan 413 representative individuals from various high risk group viz: Professional blood donors, Recipients of multiple blood transfusion, clinical cases, Drug addicts, Hemophiliacs, Foreigners and Pakistanis settled abroad. Individuals showing suspected promiscuous behaviour, and the Family members/contacts of these individuals were screened for HIV antibodies from Feb. 1987 to August, 1988.

Out of these, four cases were found positive for the HIV antibodies by employing FLISA technique and three were confirmed by Western Blot Method as well. Two individuals were foreign nationals visiting Pakistan, one of whom died of full blown AIDS. The third case was a Pakistani who presented full blown AIDS with toxoplasmosis and is the first case reported in a Pakistani national. Fourth case was an asymptomatic promiscuous lady who could not be traced further. It was found that blood transfusion abroad and sexual contacts were responsible for HIV infection in these cases.

From the finding of this study it has been concluded that although most of the cases of AIDS recognized in Pakistan are imported by people coming from abroad. Some individuals might have acquired the infection by contact with these individuals. Cases of frank AIDS acquired emphasize the need to promulgate a national policy for the clinical management of patients with AIDS and AIDS related diseases. Otherwise, these cases will be responsible for spread of the disease all over the country.

Project No.	C-QU/Phys (49)
Project Title	Coherence Properties of Radiation in Non-linear Optics and Lasers

Project Particulars

- Duration	3 years
- Date of Initiation	1.9.1986
- Date of Completion	31.8.1989
- Location of Scheme	Department of Physics, Quaid-i-Azam University, Islamabad.
- Name of the Principal Investigator	Dr. M. Suhail Zubairy.
- Total sanctioned cost	Rs,3,95,500/-

Main Objective

- i) To study problems relating to photon statistics in situation where the Radiation fields interact with non-linear system and problems relating to non-classical features exhibited during the interaction of field with two level system using method e.g., a path integral approach.
- ii) To study the 2nd and higher order coherence properties of partially coherent beams which are generated by certain generalized partially coherent sources.

Summary of the Work Done:

The project was undertaken to study the problems related to quantum optics and laser theory and to investigate the second and higher order coherence properties of partially coherent beams which are generated by certain partially coherent sources. Result of these investigations are summarised below:

a) Effect of Cooperative Atomic Interaction in Lasers:

The effects of cooperative atomic interactions in various systems which included: (i) the dynamics of a single atom in the presence of another atom and the behaviour of population inversion of two atoms interacting mutually and with single-mode quantized electromagnetic field (ii) the spontaneous emission from two atoms in non-ideal cavity under different coupling condition, and (iii) the effect of cooperativity of photon statistics and the natural linewidth in a single -mode laser. Studies on the spontaneous emission from two- level atoms inside a damped cavity showed that the spontaneous emission from one atom is intimately dependent upon the coupling strength of the second atom and is reduced considerably for a weaker coupling of the second atom

Studies on the phase sensitive dynamics of laser amplifier show that a certain choice of the relative of the atomic and the cavity field, the one of the side mode is completely quenched. A non-linear theory of a correlated emission laser is also developed and it is shown that by preparing the atoms in the grain medium in coherent superposition of states, the spontaneous emission noise is quenched in the relative phase of the laser.

b) Atom-Field Interactions Using Path-Integral Methods

The path-integral formalism was extended to spin-Bose problems in quantum optics and studies were undertaken on the dynamics of a two- level atom.

Using this formalism, fully quantum-mechanical, analytic expressions for the dynamics of the atom as well as of the field were obtained which have shown that even under the conditions in which this approximation is considered to be justified, there is significant contribution due to the energy non-conserving terms to the level population inversion. It was also shown that the energy of the atom- field system is not conserved in time but exhibits periodic collapse and revivals alongwith rapid oscillations.

c) Non-Linear Optics.

In the general area of non-linear optics the problems studied in detail include (i) The effect of laser linewidth associated with the phase fluctuations of the pump field on certain correlation functions of the signal mode in degenerate parametric amplification (ii) Certain non-linear classical effects in the context of fourwave mixing (iii) The natural linewidth of various lasers and the effect of different parameters in these lasers; (iv) The fundamental quantum limit imposed by the uncertainty relations in ultrasmall measurements (v) Linear theory of a three-level and two-level quantum beat laser (vi) Coherent trapping in two-level atoms.

d) Coherence Properties of Schell-Model Sources:

Coherence properties of the beams generated by partially coherent sources in particular, the Gaussian Schell-model source were studied and it was predicated that under suitable conditions, such a partially coherent source can increase the conversion efficiency in second harmonic generation as compared to coherent laser source. In addition the diffraction properties of a Bessel-Gaussian beam and different conditions under which such a beam becomes diffractionless were investigated

Optical Computing.

Using spatial filtering techniques, particularly the polarisation encoded shadow-casting scheme, certain multi output combinational logic units such as, logic adders and subtractors, decoders and code converters were designed. The designed logic elements are capable of parallel operation at maximum speed, i.e. the speed of light with separate and simultaneous generation of the outputs

The research work has resulted in the publication of 49 research papers in journals of International repute. Three research students who worked under this project have been awarded Ph.D degrees.

Project No. C-QU/Phys (50)
Project Title. Computer Simulation of Laser Fusion: some Aspects of Plasma Physics.

Project Particulars

- Duration 3 years
- Date of Initiation. 1.9 1986
- Date of Completion 31 8.1989
- Location of Scheme Department of Physics, Quaid-i-Azam University, Islamabad
- Name of Principal Investigator. Dr. G. Murtaza
- Total sanctioned cost. Rs.6,55,400/-

Main Objectives

To establish a working group in plasma physics with the following 3-sections.

- i) Experimental plasma physics pich Derives.
- ii) Computer simulation of Laser Fusion.
- iii) Theoretical/computational plasma physics.

Summary of the Work Done

There is a wide growing appreciation of the application of Plasma Physics, particularly towards achieving nuclear fusion. More and more countries are investing their manpower and material in this field

A study was carried out to undertake theoretical as well as experimental work in the field of Plasma Physics and controlled Fusion The results achieved are summarized below

- a) Fabrication of 3.6 KJ Mather-Type Plasma Focus and Study of Neutron Emission from it.

The plasma focus device was designed, fabricated, (including its main components like Sparkgap, trigger unit, power supply and electrodes) and successfully operated The device when operated with Deuterium worked as a reproducible and reliable neutron source Efforts were therefore made to optimize the insulator sleeve for highest neutron yield for which neutron detector was developed and calibrated by using a neutron source of intensity 105 neutrons/sec.

- b) Installation, Assembly and Operation of Q-Pinch Machine:

The machine donated by the Ruhr University Bochum, Germany, was reassembled and necessary infrastructures were designed and successfully completed for its installation in the laboratory. The machine operated with Argon gas, is being utilized for learning the spectroscopic techniques.

- c) Computer Simulation of Dense Plasma Focus (DDF):

The device was designed from empirical scaling laws. Based on the Ideal Magnetohydro-dynamics, the Mather-type Plasma Focus simulated by using the VAXII-730 computer, which led to an optimum design of the device. The dynamics of high density Z pinch, were also studied in detail.

- d) Design and Fabrication of Magnetic Forming:

A magnetic forming based on the principal of diamagnetism, was designed and fabricated and high solanoidal magnetic field was generated in it. The device can be used for the fabrication of plug in type high voltage connecting cable ends, and the Calibration of magnetic probes.

e) Radiative Thermal Instability in Magnatized Plasma:

A general formulation of electromegnetic radiative thermal instabilities were developed including the frequency ranges which are beyond magnatohydrodynamic description The results may help in understanding the turbulence and conductance phenomenon in astra physical and laboratory plasmas.

f) Electron Thermal Conductance in Laser Fusion

Studies were undertaken on the nonlocal heat transport, the electrostatic potential effect on nonlocal heat transport, Ambipolar field effect and the effect of bi-Mazwellian distribution function corresponding to hot and cold species of electrons The nonlocal heat transport model of Albritton et al was extended by solving the reduced Fokker-Planck equation.

3. SCIENTIFIC SOCIETIES/LEARNED BODIES

The promotion of learned bodies, scientific societies/associations and academics engaged in spreading the cause of scientific knowledge in general or in the pursuit of a specific scientific discipline or technology in particular.

a) The Foundation is making annual grants to the established learned bodies and scientific societies, as partial financial assistance for the achievement of their approved objectives and publication of their respective scientific journals. Annual grants amounting to Rs 0.519 million were released during the current year to following scientific societies.

<u>Name of Society</u>	<u>Grant in Rupees.</u>
Pakistan Academy of Sciences	Rs 80,000/-
Scientific Society of Pakistan.	Rs 65,000/-
Pakistan Association of Scientists & Scientific Professions	Rs 30,000/-
Pakistan Association for Advancement of Sciences	Rs 70,000/-
Pakistan Society of Nematolgists.	Rs 15,000/-
Zoological Society of Pakistan	Rs 38,000/-
Pakistan Botanical Society, Peshawar.	Rs.38,000/-
Biological Society of Pakistan.	Rs 38,000/-
Pakistan Society of Biochemists	Rs 22,500/-
Chemical Society of Pakistan	Rs 43,000/-
Institute of Electrical Engineers of Pakistan.	Rs.20,000/-
Pakistan Medical Association.	Rs 15,000/-
Sindh Science Society.	Rs 25,000/-
Institute of Engineering of Pakistan.	Rs.20,000/-

b) Grants totaling to Rs 0 095 million were also sanctioned to various institutions for publication of Scientific Journals and detailed below.

<u>Institutions</u>	<u>Name of Journals</u>	<u>Amount of Grant</u>
University of Karachi, Karachi.	Pakistan Journal of Pharmacology. Journal of Pharmacy	Rs.10,000/-
Pakistan Council of Science & Technology.	Journal of Science Technology and Development.	Rs.25,000/-

<u>Institutions</u>	<u>Name of Journals</u>	<u>Amount of Grant</u>
Pakistan Forest Institute, Peshawar	Journal of Forestry.	Rs.10,000/-
Mehran University of Engg. & Technology, Jamshoro.	Journal of Engg. & Technology	Rs.10,000/-
Khyber Medical College, Peshawar	Pakistan Oral & Dental Journal.	Rs.10,000/-
University of Agriculture, Faisalabad	Pakistan Veterinary Journal.	Rs.10,000/-
Government College, Lahore.	Journal of Natural Sciences and Mathematics.	Rs.10,000/-

1. EXCHANGE OF VISITS:

The Exchange of Visits of Scientists and Technologists with Other Countries

Foundation provides travel grant to the Scientists for participation in International Conferences in order to enable them to present the findings of research carried out by them within the country, exchange information regarding recent advances in their respective fields of specialization, and visit reputed research Laboratories in Foreign countries.

Grants totaling to Rs.0 151 million were sanctioned to the following five(5) Scientists during the report period:

<u>Name & Address of the Scientist</u>	<u>Conference/ Seminar attend</u>	<u>Grant Sanctioned</u>
i) Maj Gen. Manzoor Ahmad, Commandant, Armed Forces Institute of Pathology, Rawalpindi.	Meeting of the Asian Pacific Association for the study of Liver,19-21 February 1990, at Jakarta, Indonesia	Rs.29,343/-
ii) Dr Mahboob Ali, Department of Civil Engg University of Engg & Technology Lahore	4th International Colloquium of Structural Stability 10-12 Oct.89. at Beijing, China.	Rs.24,779/-
iii) Dr Rafique S. Mustafa Shah, Radiologist, Sindh Service Hospital, Karachi	2nd World Congress of Ultra Sound in Developing Countries 23-26 Nov.89 at Kualaumpur, Malaysia.	Rs.17,560/-

Name & Address of the Scientist	Conference/ Seminar attend	Grant Sanctioned
iv) Dr. M.R. Sabayo, Director, Centre for Higher Studies and Research Mehran University of Engg. & Technology, Jamshoro	9th Miami International Congress on Energy and Environment, 11-13 Dec. 89, at Miami, U.S.A.	Rs.29,400/-
v) Prof. Atta-ur-Rehman, Co-Director, HEJ Research Institute of Chemistry, University of Karachi, Karachi.	Symposium on Organic Chemistry 7-10 Nov.89 Shanghai, CHINA	Rs.19,460/-

AWARDS AND FELLOWSHIPS:93

AWARDS : On the recommendation of the PSF Technical Committee, cash awards amounting to Rs.15,000/- were released to the following two scientists who have shown excellent performance in their respective PSF funded research projects:

Name of the Scientist	Project No.and Title	Amount released
Dr. M.Saeed Akhtar, Deptt. of Zoology, University of Punjab, Lahore.	Pest Status, Feeding Preferences and Control of Termites of Pakistan. P-PU/Bio (136)	Rs.10,000/-
Late Dr. Mohyuddin Ahmad, Pakistan Central Cotton, Committee. Karachi.	Development of Commercial Hybrid Cotton, S-PCCC/Agr (77)	Rs.5,000/-

FELLOWSHIPS:

- Three Fellowships @ Rs.1,000/- p.m. each for a period of 2-years were awarded for M. Phil students at the Institute of Biochemistry University of Baluchistan, Quetta. An amount of Rs.36,000/- was released to the University on account of the Fellowship grant for the year, 1989-90.
- An amount of Rs.20,000/- was released to research fellow at the University of Agriculture, Faisalabad on account of partial financial assistance for the completion of his Ph.D research work.
- Financial Assistance of Rs.1,512/- was provided to the Museum Curator at Zoology Department, Baluchistan University, Quetta for one week training course in curatorial Techniques at Pakistan Museum of Natural History, Islamabad.

6. SPECIAL SCIENTIFIC SURVEYS AND STATISTICS:

As a sequel to the recommendation of the "International Conference on Science in Islamic Polity - its Past, Present & Future", held at Islamabad in November, 1983, a project entitled; "S & T in the Muslim Ummah and its Methodical Development" was undertaken by the Pakistan Academy of Sciences. The Foundation provided a grant of Rs.3,56,400/-

The project has since been completed and following Monographs and Directories have been published:

Monographs.

- i) S&T Development profiles of Muslim Countries.
- ii) Quranic Ayyat Containing references to Science & Technology.
- iii) Food and nutrition problems of the Muslim Ummah.
- iv) Fresh Water Resources of the Muslim World
- v) Minerals and their utilization
- vi) Energy, R&D for the Muslim World
- vii) Biographical notes on Eminent Muslim Scientists of 14th Century Hijra.
- viii) Growth of some facts of the Muslim World, in the first five Centuries Hijra.
- ix) Directory of Scholars engaged in studies on Science in Islamic Polity (3rd edition).

Semi-Quantitative studies on Socio-Economic, Cultural and Scientific growth in early Muslim Era were undertaken and following reports were compiled.

- i) Part-I: Growth of Muslim population, especially in first two centuries Hijra, by M.M. Qureshi & Dilbar Hussain, STIW, vol-6 (1988)
- ii) Part-II: Economic growth and per-capita income of the Muslim World in the first three Centuries Hijra, by M.M. Qureshi & Idrees Hussain, STIW, Vol-7 (1989).
- iii) Part-III Per-capita Income in the Mughal Empire and the Ottoman Empire in the period 1350 to 1750 A.D. by M.M. Qureshi & Idrees Hussain.

In addition, a number of papers were presented at different Conferences/Seminars. This Vast projection of the compiled data will ultimately help to produce increased scholarly interaction among Scientists & Technologists in Pakistan and abroad.

The project work has clearly demonstrated that a sizeable nucleus of researchers is available in Pakistan who are prepared to work in the philosophy of Science as well as on the future development of S&T in Muslim Ummah.

7) SCIENTISTS POOL:

Dr Rizwan Butt was appointed on PSF Scientists Pool and assigned teaching duties at the Department of Mathematics, Punjab University, Lahore for a period of six months pending his appointment in the University. An amount of Rs.18,000/- was released to the University on account of his subsistence allowance @ Rs.2,500/-p.m.

8) INTERNATIONAL LIAISON:

The activities performed by the Foundation under this head are as under:-

A) Memorandum of Understanding between the Royal Society of London, U.K. and the Pakistan Science Foundation

- The visits of the following two British Scientists both from Department of Chemistry, University of Glosgow, U.K were supported by the Foundation under the M.O.U. with Royal Society of London.

<u>Name of the Visiting Scientists</u>	<u>Place of Visit</u>	<u>Duration</u>
- Dr. D.S. Rycroft.	HEJ Research Institute of Chemistry, Karachi.	25.01.1990 to 10.02.1990
- Dr. I.C. McNeill.	Quaid-i-Azam University	02.04.1990 to 10.04.1990

The visiting Scientists exchanged information with their local counterpart and delivered lectures in their fields of specialization.

As per M.O.U., the Foundation met their local expenses amounting to Rs.24,519/- during their stay in Pakistan.

B) LIAISON WITH OTHER AGENCIES:

Collaborative Project with U.S. National Science Foundation:

The Foundation is acting as a focal point for the Universities in respect of collaborative research projects and Seminars/Conferences funded by the US National Science Foundation under their special Foreign Currency Programme. Currently a project entitled; "Chromosome Number of Vascular Plants of Pakistan" is being implemented at the Department of Botany, University of Karachi. During the year, 89-90, a grant of Rs.385 million was released for the continuation of project work.

Collaborative Seminars with Scheffield University U K.

A National Seminar on "Structural Integrity" was organized by the Foundation in collaboration with the Scheffield University, U.K. from 22-25 July, 1989 at Islamabad, wherein, eight Foreign Experts delivered a Series of thirty two (32) Lectures on four major topics i.e. Corrosion Fatigue, Failure analysis, High temperature Fatigue and Fatigue of Single Crystal Super Alloys.

As many as 90 local Scientists/Engineers from various R&D Organisations, Industries, Defence Production Units and Universities participated in the Seminar. The lectures delivered in the Seminar will be compiled in a book form which will serve as a valuable source of information on the subject. The Foundation incurred an expenditure of Rs. _____ on the Organisation of this Seminar.

Association of Pakistani Scientists and Engineers of North America (APSENA):

The Foundation is also acting as a focal point for Expatriate Pakistani Scientists and Engineers of North America (APSENA). During the year under report, a meeting of the (APSENA) Members with local Scientists and Engineers was organized in the Office of the Foundation wherein the possibilities of assistance by the APSENA Members to the R&D Organisation of the country were discussed
Chinese Academy of Sciences

A ten membered team from the Chinese Academy of Sciences visited Pakistan to participate in the Pak-China Joint Survey of the Karakorum Mountains from 28th September to 31st October, 1989 under the item: 9-204 of the S&T protocol signed between the Governments of Islamic Republic of Pakistan and the Peoples Republic of China. Accompanied by their Pakistani counterparts from various Organisations including Universities of Peshawar & Karachi: Hydrocarbon Development Institute, and the Pakistan Museum of Natural History, Islamabad, the team jointly surveyed the Karakorum Mountains from Khunjrab right down to Besham. The team also visited Swat, Peshawar and Salt Range. The Pakistan Science Foundation being the host Organisation, organized Joint Survey programme of the Karakorum Mountains. The local expenses of the visiting Scientists amounting to Rs 0.150 million were borne by the Foundation. Whereas, TA/DA of local counterparts were borne by their parent Organisations

SCIENCE POPULARIZATION SECTION.

The activities of Science Foundation for promotion & popularization of Science through various programmes continued during the year 1989-90. A summary of these programmes is given below:

1) FUNDING FOR CONFERENCES, SYMPOSIA, SEMINARS, WORKSHOP.

The Foundation provided financial assistance for National and International Science Conferences, Seminars, Symposia and Workshops held in Pakistan. During the period under report grants totalling Rs.2,33,220/- were given to various Scientific Organisations and institutions for the organisation of such events:

<u>Events</u>	<u>Organizing Agency</u>	<u>Amount Granted</u>
Youth Science Conference	Scientific & Cultural Society of Pakistan.	Rs.20,000/-
International Symposium on Protein Structure and Function.	H.E.J Research Institute of Chemistry University of Karachi Karachi	Rs.25,000/-
UNESCO Regional Workshop on Application of Mathematics to Operational Research and Optimization.	Islamia University Bahawalpur	Rs.13,220/-
Workshop on Teaching of General Science.	Islamia Collegiate School, University of Peshawar Peshawar	Rs.10,000/-
School on Fundamental Physical and Cosmology	Quaid-i-Azam University Islamabad.	Rs.20,000/-
Fourth International Symposium on Natural Products Chemistry	H.E.J. Research Institute of Chemistry Karachi Karachi.	Rs.40,000/-
International Symposium on Advanced Materials	Pakistan Institute of Metallurgical Engineers Islamabad Chapter Islamabad.	Rs.30,000/-
First International Conference on Chemistry	Department of Chemistry University Teachers, Association, University of Peshawar Peshawar	Rs.15,000/-
Fourth International Seminar of Albert Einstein Society	Physics Department, University of Karachi Karachi	Rs.10,000/-
SEGMITE Conference on Industrial Minerals	PCSIR Laboratories, Peshawar	Rs.10,000/-

10th Zoological Congress 26-28th May, 1990.	The Zoological Society of Pakistan.	Rs.30,000/-
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National Seminar on Statistics for Development	Allama Iqbal Open University Islamabad.	Rs.10,000/-
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2. Science Fairs/Exhibitions

During the period under report a grant of Rs.30,000/- was sanctioned for the following purpose:

8th Science Exhibition	Department of Education Bureau of Curriculum and Extension Centre, Baluchistan, Quetta.	Rs.30,000/-
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3. Popular Science Lecture

A total member of six lectures were organized at PSF auditorium in which eminent Scientists/Scholars addressed themselves to the audience in non technical language

The names of speakers & topics are as below:-

<u>Date</u>	<u>Name of Speaker</u>	<u>Topic of Lecture</u>
July, 1989	Lt Gen. (Retd.) Dr Syed Azhar, Director General, National Institute of Health Islamabad.	Perspective for Pakistan Preventions of Diseases.
August, 1989	Mr. S.H. Faruqi, Chief Geologist, PMDC, Islamabad.	Rock Salt, the most Potential Mineral Resource of Pakistan.
December, 1989	Prof Dr. S A Faseeh Ex-Chairman, Chemistry Department University of Karachi Karachi	First Decimal Calendar-A New Concept.
November, 1989	Dr Z.A Hashmi and Dr. Inayatullah Islamabad.	Senior Citizens and Health Care: Social and Psychological Dimensions
January,	Brig. (Retd) Mohammad Yasin Director Technical Coordination, National Institute of Electronics Islamabad.	Effects of Electric Shocks
March, 1990	Dr. B.D. Jones Overseas Development Natural Resources Institute, London U.K.	Mycotoxin Problems in Pakistan.

4. FILM, PLANETARIUM AND SLIDE SHOWS:

A) Science Film Shows.

The Foundation continued screening Science Films in schools of Islamabad/Rawalpindi. A total member of 80 shows including 40 shows at Rawalpindi District Schools were arranged during the period under report.

B) Planetarium Shows.

- The Planetarium Shows arranged during 1989-90 are
- Shows arranged at Schools in Islamabad/Rawalpindi 35
- Shows arranged at Institutions in Rawalpindi District 40
- Shows arranged at the premises of Pakistan Academy of Sciences for Youth Welfare Division 10

The planetarium accompanied Science Caravan to Kohat from 21st November 1989 to 8th December 1989.

C) Slide Shows.

Slides with Synchronized Urdu Commentry on the following Scientific themes have been prepared for screening in schools.

- i) Our Universe
- ii) The Dianosaur's Age
- iii) The Sea World (Karachi Harbour)
- iv) Science Posters Project

Also five hundred (500) Slides on a number of interesting Scientific topics have been purchased from MMI Corporation U.S A.

5. DISTRIBUTION OF SCIENCE BOOKS & MAGAZINES.

The Foundation this year also distributed Books/Magazines to educational institutions free of cost. The details of the distribution are as under -

- A) Sets of 80 books on Science related themes, including Urdu Science Board Lahore as well as PSF's own publications were donated to each of sixty (60) schools all over the country. These schools are not participants of the Foundation's Science Clubs Programme.
- B) The subscription, of Science Magazines 'Jadid Science' and Science Bachoon Kay Lyea to 500 schools was renewed for the year 1989-90.
- C) Urdu Magazine. 'Science Digest' was provided on regular basis to sixty (60) schools of Baltistan, Gilgit, AJK, FATA and Baluchistan.

6. Science Posters Projects.

The 4th Set of Science Posters comprising of the following topics was prepared, printed and distributed to all the high schools falling with in the jurisdiction of the Boards of Intermediate & Secondary Education in the country as well as to R&D institutions.

1. Portrait of Muslim Scientist Nasir Al-Din-Al-Tusi

2. Portrait of Muslim Scientist Abul-Wafa Muhammad Al-Buzjani

3. پاکستان کی دریائی مچھلیاں
4. آسمان اور برج
5. معدنیات کی سختی
6. بن سبلی گھر
7. موٹر کار
8. ریلوے انجن
9. ہوائی جہاز
10. دیمک

This activity of the Foundation has been highly appreciated by the students/Educationsists and the general public.

7. Science Posters Contest.

Students from seven Boards of Intermediate & Secondary Education participated in the 3rd Inter Board Science Posters Contest announced by the Foundation in January, 1989. The theme of the contest was "Science & the Natural Wealth". The entries submitted by the Boards were judged by a panel of experts and the following three prizes of Rs.2,000/- Rs.1,200/- and Rs.800/- were awarded respectively

- | | | |
|----|---|-----|
| 1. | Mr. Nusrat Iqbal Bhatti
PAF Inter College, Masroor
Karachi.
(Federal Board of Intermediate
& Secondary Education, Islamabad). | 1st |
| 2. | Mr. Babar Balouch
Public School, Hyderabad
(Federal Board of Intermediate
& Secondary Education, Islamabad) | 2nd |
| 3. | Miss. Shagufta Naureen
Govt. Girls Pilot Secondary School Sargodha.
(Board of Intermediate & Secondary
Education, Sargodha). | 3rd |

8) 2nd Intra Board Science Essay Competition.

The 2nd Intra Board Science Essay Competition on the theme " سائنس اور معاشی خوشحالی " was announced by the Foundation in April 1990. The announcement was conveyed to all the Boards of Intermediate & Secondary Education in the country The language of the competition was Urdu & Sindhi.

9) Promotion of Science in Rural Areas Science Caravans

All the three units of Science Caravan, viz, the Federal Unit, the NWFP Unit and the Sind Unit continued activities in their respective areas, i e. the Federal territory of Islamabad and Rawalpindi District, NWFP and Sind. The work for the construction of the 4th unit for Baluchistan was awarded to M/S Techma International (Pvt.) Limited Lahore and is almost complete. It shall be launched in Baluchistan in the fiscal year 1990-91. Some equipment for the Baluchistan Unit has also been purchased.

A) Science Caravan Unit for Federal Area.

The Science Caravan activities during the year 1989-90 are as under:-

- i) The Caravan visited Lawrence College Ghora Gali (Murree) from 3-5 December 1988, and 26-29 September 1989. It also arranged Planetarium Shows. The exhibition witnessed by 5000 students of the host College & the six surrounding schools was highly appreciated.
- ii) The participants of the workshop on Technology of General Science held at Peshawar University from 29th December 1989 to 4th January 1990 visited exhibition of the Science Caravan at the Pakistan Academy of Science.
- iii) On the request of the Government M C. Girls High School, Gujjar Khan, an exhibition of the Caravan was arranged at Pakistan Academy of Sciences, Islamabad on 10th January 1990. Planetarium and film shows were also arranged
- iv) The Federal Area Unit participated in the youth week organized by Youth Affairs Division by arranging an exhibition at the Federal Government Girls Secondary School, Sihala on 19-20 June 1990. Federal Minister of State for Science & Technology, Senator Javed Jabbar presided, while Federal Minister of State for Youth Affairs Mr. Perviz Ali Shah was the Chief Guest. The exhibition was largely attended by the representatives of Science & Technology Organisations, Officials of both the Ministers, Directorates of Education Islamabad/Rawalpindi, teachers, students and the residents of the Area.

B) Science Caravan Unit for NWFP

- i) The Science Caravan Unit for NWFP was formally launched on 12th October 1989 by arranging its exhibition at the Govt. High School for Boys Pabbi. The Ceremony was largely attended by the officials of the Department of Education NWFP, Headmasters/Headmistresses of the surrounding fifteen schools alongwith their Science Teachers and five students from each school 1200 students of the host school also witnessed the exhibition, the same day. The exhibition continued till 22nd October 1989 and witnessed by more than 4500 students from 15 schools in 20 KM radius. The exhibition was highly appreciated by the Education Department.
- ii) The Caravan Exhibition was inaugurated by Senator Javed Jabbar, Minister of State for Science & Technology at Government High School, Usterzai Payan, on 22nd November 1989. The inauguration was largely attended by representatives of the Education Department at Kohat Peshawar, Teachers students, Notables of the area and the general public Mr. Masud Kauser, Speaker of the NWFP Provincial Assembly was also present on the occasion The exhibition continued till 1st December 1989. 3500 students besides the general public witnessed the exhibition.
- iii) The Caravan then moved to the Comprehensive High School for Boys, Kohat at the request of Divisional Director of Education Kohat. The exhibition was open for students from 1st December 1989 to 7th December 1989 and visited by 3000 students from the schools of adjoining areas.
- iv) The Science Caravan arranged its exhibition at Government High School, Charsadda, from 14th January 1990 to 18th Jan. 1990. 3000 students from eight different schools witnessed the exhibition.
- v) The Caravan arranged its next exhibition at Pir-Pai, from 10th to 15th March 1990, exclusively for girl students. 2000 girl students/ladies of the area witnessed the exhibition.
- vi) The Science Caravan exhibitions were also arranged at:

a) Government High School Hayatabad.	12.4.1990 to 19 4.1990	600 students from Nine schools attended
b) Government High Schools/ Higher Secondary Schools Karak District.	27.5.1990 to 13.6.1990	Students from 40 schools attended

The Science Caravan is receiving full cooperation from the Education Department of the Province.

C) Science Caravan Unit for Sindh.

- i) The Science Caravan Unit for Sindh was formally inaugurated by Senator Javed Jabbar, Minister of State for Science & Technology at Government High School, Islamkot, District Tharparkar, on 28th November 1989. The function was largely attended by the representatives of the Scientific Institutions, Education Department, Teachers/Students of the nearby schools and notables of the area. The exhibition remained at the Islamkot till 1st December 1989, and was visited by 3000 students from nearby 24 schools. One day was exclusively reserved for the ladies & Girls students.
- ii) The Caravan then moved to Tando Kolachi on 2nd December 1989 to arrange exhibition at Government Boys High School. 2000 students from high middle & primary schools of Tando Kolachi, Nabisar and adjoining villages visited the exhibition.

The Caravan returned to Hyderabad on 5th December 1989.

- iii) The Caravan participated in the Science Fair held at Mirpurkhas from 24th-26th January 1990, Organised by the Board of Intermediate & Secondary Education, Hyderabad 7000 students from 34 schools witnessed the exhibition. A Gold Medal was awarded to the Science Caravan, being one of the best exhibits at the Fair.
- iv) The Science Caravan Exhibitions were also held at:-

a) Government Boys High School, Hala.	14.2 1990 to 25.2 1990	2500 students from 9 schools witnessed the exhibition
b) Government Boys High School Matiari	9.3 1990 to 15.3 1990	2600 students from 7 Schools visited.

10. Science Clubs Programme.

Phase I of Science Clubs Project involving 500 schools, located mostly in the rural areas of Pakistan, was formally inaugurated by Dr. M.D. Shami Chairman, Pakistan Science Foundation, on 27th December 1989, at the premises of Pakistan Academy of Sciences, Islamabad. The ceremony attended by representatives of schools (Science Teachers) located in Islamabad and the adjoining areas, were presented with the following items.

- 1) Solar Cooker alongwith cooking utensils and the instruction Booklet.
- 2) Ten copies each of the Booklet "Projects for High School Science Club", published by the Foundation.
- 3) Ten copies each of the PSF publications, Baluchitherium, the Planets World etc.
- 4) 2 Sets each of 24 booklets on Science related themes, published by Urdu Science Board, Lahore.

5) Financial assistance of Rs.500/- for performing the Science Projects.

For schools situated in the Provinces, the above items were dispatched by Trucks to Focal Points, Peshawar, Bannu, Lahore, Nawabshah, Karachi and Quetta. The schools involved in Science Clubs Programme were informed by post to collect these items from the focal points. Phase II of Science Clubs Programme was also initiated. Letters alongwith proforma to ascertain interest of schools in the programme and the facilities available were sent to 1000(one thousand) schools all over the country After evaluation of the replies received, 228 schools were selected for Phase II. The items donated to schools of Phase I were also dispatched to Phase II participants. Six new publications were added to the set of Science related booklets, published by Urdu Science Board, Lahore, thus brining the total of books in each set to 30.

List of Book titles is as under:-

دیسپاتی زندگی اور شہری زندگی	16	صحت و صفائی	1
ذرائع آمد و رفت	17	فن اور دستکاریاں	2
اولیا اللہ حصہ اول	18	تاروں بھری رات	3
اولیا اللہ حصہ دوم	19	ایٹم	4
ہوا	20	مقناطیس	5
پالتو جانور	21	قسم قسم کی بیٹنیں	6
سشد کی کبھی	22	بیکریا ہمارے دوست ہمارے دشمن	7
خلانی سفر	23	عزت میں عظمت	8
چیمونٹی کمرہ سی شہد کی کبھی	24	مشہور ایجادیں	9
زمین کی کہان	25	نباتاں	10
خلا میں سفر کے چھ سو سال	26	خوراک کی حفاظت	11
حرارت کیلے	27	عام نگیں بیماریاں	12
ببلی کیلے	28	ہمارا جسم کیسے کام کرتا ہے	13
کشش ثقل	29	مثالی گاؤں	14
آئیے کائنات کو دور بین سے دیکھیں	30	ہمارے پیارے نبی	15

11) Survey.

A Survey of science Popularization Activities in the country was initiated. Letters to the effect were sent to numerous organisations & the media.

12) Awards.

- i) The Foundation nominated Dr. M.D. Shami, Chairman PSF for the 1990. Kalinga Prize for the Popularization of Science - a UNESCO Award. The Prize has been awarded to Dr. Shami.
- ii) The Foundation constituted an annual award of Rs.10,000/- for Pakistan Association for Computer Education in Schools (PACES), which will be given to the best school team working on computer.
- iii) The Foundation constituted an annual award of Rs.5,000/- for Mirpurkas Press Club for excellence in Science and Technology Reporting.

13) Art/Design Work.

The following Design work was carried out:

- i) Monogramme of the Pakistan Academy of Sciences.

- ii) Invitation Card for the Foundation Stone laying ceremony of Pakistan Museum of Natural History.
- iii) Title Cover for the Book, "Projects for High School Science Clubs", published by PSF.

PAKISTAN SCIENTIFIC & TECHNOLOGICAL INFORMATION CENTRE (PASTIC)

PASTIC with its National Centre at Islamabad and four Sub Centres at Karachi, Quetta, Lahore and Peshawar continued providing various types of services to S&T Organisations in the country. These services included: Document procurement & supply services, patents, bibliographies, microfiches, translations, current contents, technology information and reprographic services. The progress of the PASTIC activities undertaken during the report period are summarized as under:-

1. Information/Documentation Section:

- a) Document Procurement & Supply: 2405 S&T documents were procured from National/International Sources and supplied to researchers of S & T/R & D Organisations. The number of requests received were 2416.
- b) Bibliographic Service: Twenty three (23) subject bibliographies containing 416 references were compiled and supplied to the clients.

- 901 bibliographic citations on account of bibliographic requests were collected from the NARC Database (AGRICOLA), Islamabad.

- c) Abstracting & Indexing Service.

- A total of 60 journals were scanned, 600 abstracts and 2000 Keyword index entries were made, 1300 UDC classification numbers assigned for the Pakistan Science Abstract Vol.29, No.2,3,4 during the period under report.

- The manuscript of Pakistan Science Abstracts Vol.29, No.1, (1989) consisting of 151 abstracts was composed and printed.

- d) Union Catalogue.

Under an action plan for compilation of National Union Catalogue, 30 major Libraries in the country were requested to provide data on their serial holdings. Also lists of S & T Journals held by the libraries of (1) Pakistan Association for the Advancement of Science Lahore and Khyber Medical College, Peshawar were compiled and 1092 data entries of the two libraries were computerised.

2) Programming & Data Processing Section.

- a) Computerization of S&T Information

29,326 data entry records and 3050 print outs on account of 240 Variegated jobs were produced on computer during the period under report. Different software such as Word Processing, Dbase²⁺, Dbase³⁺, and Micro/CDS/ISIS were used for producing following information Services. (a) CEHANET Netsletter, (b) NTIS Reports, (c) Pakistan Science Abstracts (d) Technology Information, (e) Union Catalogue, (f) PASTIC Library Records, (g) Bibliographies and (h) Patent Indexes.

- b) Computer Courses.

- i) First PASTIC/UNESCO PGI National Training Course on Micro CDS/ISIS was conducted from 16-30 August, 1989 jointly by PASTIC, Quaid-i-Azam University & PSF. 21 nominees from 19 organisations across the country attended the course.
- ii) Second Training Course on the application of CDS/ISIS was conducted from 17.2.1990 to 28.2.1990 jointly by PASTIC and COMETO at Lahore. 13 nominees from 12 organizations participated in this course.
- iii) Provision of Computer Software facility to other organisations

PASTIC provided computer software know-how to the Ministry of Science and Technology, Pakistan Council for Science & Technology, Quaid-i-Azam University during the period under report.

3. Technology Information Service.

PASTIC disseminated technological and industrial information to a total of 4281 potential users/entrepreneurs in the public and private sectors through Nine monthly issues of the publication viz, 'Technology Information' during the period under report

4. International Liaison.

- a) Environmental Information: UNEP/INFOTERRA, radio tracer method, aflatoxins in foods, post diarrhaeal foods, meat spoilage etc was catered to the environmental research scientists during the period under report. In addition, 34 S&T research institutions were enlisted as relevant sources for the domestic environmental information system.
- b) CEHANET: Data base
 - i) 380 data entry sheets were filled with environmental health information and recorded in the database.
 - ii) News letters: Environet News.
7 issues of Environet News produced and mailed out to 415 individuals interested in environmental health science.
 - iii) CEHANET Content Service.
The C.C.C. service was started in June, 1989 Six bimonthly issues based on environmental health journals were distributed to 75 users in selective subjects.

c) ASTINFO/UNESCO/PGI

- a) A report on the PASTIC participation in the 7th consultative Meeting was sent to PSF/MOST during the period under report (b) A second report on utilization of the UNESCO/ASTINFO Assistance provided to PASTIC was forwarded to ASTINFO Secretariat, Thailand. (c) PASTIC made a formal request to ASTINFO for the names and addresses of the resource persons for the workshops to be organized during 1990-1991.

d) Questionnaire from Foreign Information Agencies.

- a) 21. paged questionnaire received from Islamic Development Bank, Jaddah through Federal Bureau of Statistics, Islamabad was completed and discussed with the Representative of the IDB for exploring possibility of cooperative links between PASTIC and OIC System Network.
- b) A second questionnaire received from ICSTI, France was duly filled in and fedback.
- c) A 3rd questionnaire was received from ISESCO which was completed and sent back.

5. PASTIC National Science Reference Library.

1210 issues of different serials, 332 miscellaneous documents and 124 books were received, accessioned, classified, catalogued and shelved during the period under review. In addition, missing issues of 122 journals were obtained and the gaps were filled.

6. Reprographic Unit.

- a) **Printing:**
175,956 impressions on account of printing of 101 jobs were supplied to the clients during the period under report.
- b) **Photocopying/duplication:**
 - i) 1,24,275 pages of photocopies were made against 656 jobs during the period under report.
 - ii) 7,515 duplicate copies were made during the period under report.

7. Participation in CEHANET Workshop:

- i) Miss Nageen Ainuddin, Documentation Officer attended the First Workshop on CEHANET Procedures held in July, 1989 at Amman, Jordan.
- ii) Second Regional Workshop on CENANET Procedures was also attended by the Documentation Officer in May, 1990 at Amman, Jordan.

8. Planning & Development Committee of PASTIC

Aims & Objects:

A Planning & Development Committee (P&DC) comprising senior technical officers of PASTIC was constituted on 5th May, 1990 to (i) review and coordinate technical activities of various sections (ii) initiate proposals for improvement of existing services and (iii) recommend ways and means for the implementation of the proposals.

Meetings:

Two meetings of P&D Committee were held on 10.5.1990 and 21.6.1990 respectively wherein recommendations were made to improve the Document Supply Service, revise the subscription rates of PASTIC publications and initiate income generating projects according to the perception of the Ministry of Science & Technology. Action on these recommendations is underway.

9. Development Programme of PASTIC

The Development Programme has been carried out in the following three areas:-

- a) **Strengthening of PASTIC National Science Reference Library.**
Library Project was approved for a period of 3 years at the cost of Rs.4.00 Million for the purchase of primary and secondary journals, reference books, etc. An amount of Rs.0.1 Million was provided in ADP 1989-1990, which was fully utilized during the report period.
- b) **Current Contents Service.**
The C.C.S. project of 2 years duration was sanctioned at the cost of Rs.2.20 Million and an amount of Rs.0.1 Million was allocated during the ADP 1989-90. The 3rd and 4th quarter grant received during the report period was fully utilized. Based on the outcome of a survey of 1000 Scientists/Researchers, the Current Content Service was provided each month to 301 individual scientists in the fields of Biochemistry, Earth Science, Mathematics, Physics and Technology. As many as 33 articles were supplied on demand to 12 scientists during the period under review.

c) **Setting up Database Facility at PASTIC:**

The project was approved at a cost of Rs.2.20 Million for a period of 3 years. An allocation of Rs. 0.5 Million which was made during the year 1989-90 was fully utilized in obtaining the basic unit of Mini Computer IBM System RISC/6000 M-320 with 3KVA stabilizer and a Star Printer.

10. Enhancement of Institutional Capabilities.

- a) PASTIC has installed FAX at its National Centre, Islamabad with an Institutional support grant of Rs.35,000/- received from the Pakistan Science Foundation. The FAX number is 811381.
- b) PASTIC has also installed EPAX Telephone 2X10 Line System to provide telephone facility to various Technical Sections. The EPAX Exchange Number are ; 811375 & 822342.

PAKISTAN MUSEUM OF NATURAL HISTORY

Pakistan Museum of Natural History continued to function in three rented buildings located in Islamabad. In addition a display corner is also functioning at Margzar - the Islamabad Zoo. A permanent building for the Museum is under construction near Lok Virsa at Shakarparian. The construction work started in September 1989 is progressing at a fairly rapid speed. An amount of Rs. 10.4 Million, out of tendered cost of Rs.68.5 Million was released by Government during 1989-90. It is estimated that if the remaining funds for the purpose are received in time, the building would be completed by September 1993. On completion, the building will house the three Science Divisions, namely, the Botanical Sciences, the Earth Sciences and Zoological Sciences in addition to the Administrative and Public Service Division under one roof. This will facilitate accelerated progress in the activities of the Museum. The Museum is actively engaged in Research, Conservation and Education involving Pakistan's heritage of natural resources. The fauna, flora, rocks, minerals and fossils found in the country are being collected, identified, preserved and curated, which constitute the primary objective of the Museum. It functions as a repository of country's natural history specimens. The Museum is also engaged in providing consultancy services to other organisations. The Museum has finalized a contract of Rs. 1.5 Million with National Museum of Science & Technology, Lahore for the construction of its Natural History Section.

Pakistan Museum of Natural History consists of the following 5 principal Divisions:

- 1. Botanical Sciences Division
- 2. Earth Sciences Division
- 3. Zoological Sciences Division
- 4. Public Services Division
- 5. Administrative Services Division

The progress made by the Pakistan Museum of Natural History during the year 1989-90 is summarized below:-

1. Botanical Sciences Division:

a) **Reference Collection:**

Field trips were carried out in Islamabad, Galiat, Swat, Kaghan and Mianwali areas. A total of 2122 higher plants and 681 lower plants were collected.

417 Species of trees, herbs and shrubs were collected from Galiate, Islamabad, Cholistan, Karachi and Coastal areas for National Museum of Science and Technology, Lahore for its Natural History Section.

b) **Laboratory Work**

Preservation, mounting and labelling of 1674 higher and 321 lower plants was done.

Identifications of 1936 higher plant specimen and 306 lower plants were made.

Cataloguing of 300 plant specimen including both higher and lower groups was completed.

c) Research Work.

i) **Projects Completed/in Progress**

Project entitled "Ecological Studies of the Mushrooms and Toad Stones of Kagan Valley" was completed and final report prepared.

First year's report on Project " Ecological studies on the vegetation of Swat', prepared and submitted to PSF.

ii) **Projects Proposed/Submitted**

Ecological studies on the vegetation composition and Soil plant insect interaction of Swat district.

Biographical and ecological studies of the flora and fauna of Pakistan with special reference to conservation.

d) Extension Work and Services rendered to other Organisations.

Identified 102 plant specimen for the students of different Colleges of Rawalpindi - Islamabad.

Provided guided tours and detailed information regarding the exhibits/displays in the Museum galleries of Schools/Colleges, and other distinguished visitors.

e) Publications.

S.M. Shah, Z.K. Shinwari and J. Shah,

"Liliaceae of Rawalpindi, Islamabad, Abbotabad & Mansehra Districts". Sci. Khyber, 2 (4), 1989, P.41-58.

B.M. Inam, F.Hussain and F.Bano,

"Canabis Sativa L. is Allelopathic" Pak Jour. Sci. Res.,32(9), 1989, P.617-620

Z.K. Shinwari, S. Gorski, and M.R. Awan, Taxonomic Studies, of Weeds of Wheat Fields of Attock District.

Pak. Jour. Weed Sci. Res., 1990, 3(1), P: 31-41.

2) Earth Sciences Division.

a) **Reference Collection**

Collection of rocks minerals and fossils: Geological studies alongwith extensive collections were undertaken in parts of Rawalpindi, Kalar Kahar, Khewra, Sulaiman Range, Chinji, Dhok Pathan, and Mianwali areas. These field studies provided 113 samples including minerals/sediments/rocks.

b) **Laboratory Work.**

Peterographic studies of 67 specimen of granite, Sandstone from Malakand and Khewra were carried out.

Specific gravity of 25 samples of Khewra Sandstone and mineral samples of Northern area of Gilgit and Baltistan were worked out.

Interpretation of X-ray diffrac to grams of the Torba Formation from the Salt Range were carried out

Taxonomic studies of Annelid fossil trails from Salt Range were completed.

Power samples of Patala Formation rocks, Kala Chitta Range were prepared, in connection with the salinity, moisture and organic matter evaluation studies.

Taxonomic studies of palecytodes from Nomal Formation, Eastern Salt Range were completed.

c) Research Work

i) **Projects Completed/In Progress**

Preliminary studies of Lower Siwalik Tragulidae.

Geochemical and Clay mineral studies of Patala Formation exposed at Nomal Gorge.

Geology and Emerald Mineralization of Barang, Bajora Agency.

Annual Report of the Research Project "Minerology and Geochemistry of the Cambrian Formation in Salt Range submitted to PSF.

(ii) Project Proposed/Submitted

- Economic geology of Ophiolites (in association with MICT, Pakistan).

- Geology and Geochemistry of blue beryl/beryllium ores of NWFP and Northern areas of Pakistan.

- Tectonic evolution of the Khewrite and its alteration close to a major Salt deposit.

- Chemistry & industrial application of the Jutana Formation (In Collaboration of NPSL, Islamabad).

- Green Garnet of NWFP, Pakistan.

(d) Extension Work and Services Rendered to Other Agencies

- 42 Samples of minerals were identified for different educational organisations.

- Collaborative research project between PMNH and NPSL entitled "Geochemistry of Jutana Dolomite" in progress

(e) Publications

- S.R.H. Baqri and N. Iqbal, "Geochemical and Clay mineral studies of Patala Formation exposed at Nomal Gorge, Salt Range," Kashmir Jour of Geology 1989, Vol.6-7.

-S. Hussain and H. Dawood, "Geology and Emerald mineralization of Brag, Bajour Agency," Kashmir Jour f Gelgy 1989, Vol. 6-7

3. Zoological Sciences Division

(a) **Reference Collection**

Collection of Fauna:

Field trips were conducted in parts of the districts of Islamabad, Galiat, Swat, Mansehra, Gilgit, and Baltistan. Extensive representative samples of Vertebrate and Invertebrate animals were collected, which include 4677 insects, 274 mammals, 1000 fishes, 262 amphibians/reptiles and 183 birds.

(b) **Laboratory Work**

Preservation mounting and Labelling of 7200 insects and 300 lower invertebrates was completed.

35 species of butterflies were identified

Texidermy of 4 mammals, 9 birds, 6 reptiles, 16 fishes and 9 amphibians completed.

Studies on the herpetological collection of PMNH, with reference to their distribution were carried out in collaboration with Dr. Auffenberg of Florida Museum, U.S.A.,

(c) Research Work

i) **Projects Completed/in progress**

- A revision of the genus *Antestia* Stal (Heteroptera: Pentatomidae) with description of four new species.
- Annual profiles of sex steroids in blood plasma and ovarian tissue of wild female shrew *Suncus murinus*
- A taxonomic Key to water mites (Hydracrina) of Pakistan.
- Fine structure of Labium in the Penta-tomidac with special reference to Phylogeny.

(ii) **Projects Proposed/Submitted**

- Taxonomic and ecological studies of Asian Fauna of Kaghan Valley.
- Exploration of Ichtyo and Herpeto-fauna of Azad Kashmir
- Impact of Water Pollution on fish and othre aquatic Life in Pakistan.

(d) Extension work & Services Rendered to other Agencies

170 Slides and other samples of marine fauna were identified and labelled for various educational institutions.

(e) Publications

- S.Khatoon and S.R. Ali, 'A taxonomic Key, to the Water mites (Hydracina) of Pakistan. Pak. Jour of Sci & Ind. Res., 1989, 32 (9), P. 612-616
- K.J. Baig, "A new species of Agama (Sauria Agamidae) from Northern Areas of Pakistan Bull. Kit. Mus. Nat. Hist. Japan, 1989, 9, P:117-122.
- S.A. Hassan, "Fine structure of Labium in the pantatomidae with special reference to phylogeny," Pak. Jour. Zool. 1989, 9, P"147-150.
- L.A.Abro and S.A. Hassan, "Description of male genitalia of *Ledosocasis azhari* (Pentatomidae. Pentatomianae) from Pakistan.: Pak. Jour. Sci. & Ind Res., 1989, 32 (12), P: 823.
- S.A.Hassan, M. Afzal and I Ahmad, "Description of new genus and species of Pentatomidae (Hemiptera, Heteroptera) from Pakistan, Pak. Jour. Sci & Ind. Res., 1989, 32 (11), P.764 -S.A. Hassan, "Fine structure & functions of metathoracic external scent apparatus with special reference to Phylogeny.: Pak. Jour. Zoo..1990, 22 (2): P 167-171.
- S.S. Sahibzada and M. Afzal, "Muscapid Birds of Hunza,Biologia, 1990, 36(1): P" 71-74.
- S.A. Hassan and M. Afzal, "Studies of the genus *Dolycoris* Mulsant & Rey (Pentatomidae: Carpororini) with description of four new species from Pakistan," Biologia, 1990, 36 (1), P:57-63

PUBLIC SERVICES DIVISION:

a) **Museum Display and Maintenance:**

Following display assignments were completed:

- Restoration of exhibits in dioramas of vegetation zones were carried out
- Prepared block game about Prehistoric wild life for children discovery room.
- Prepared schemes regarding display of Gemstones of Pakistan and Compiled a report on educational facilities for the popularization of Science.

- Carried out repairs/maintenance of the existing displays of the Museum
- Different other works like the write ups for new displays, brochures/pamphlets, posters etc. were prepared.

b) Educational Activities:

- Film shows were arranged for 3 different schools of Rawalpindi/Islamabad.
- 51 guided tours were provided with information regarding plants, animals, fossils, minerals etc. displayed in the main Museum building.
- Ten posters were prepared for PSF Science Popularization Programme.
- Details for collaboration for setting up Natural History Corner at National Museum of Science & Technology were worked out.

c) Number of Visitors:

Museum Building	14,668
Display Corner (Marghazar)	2,82,967

CHAPTER - 2

ORGANIZATION AND ADMINISTRATION

The organizational structure of the Pakistan Science Foundation, Pakistan Scientific and Technological Information Centre and Pakistan Museum of Natural History are given on page 55, 56 & 57

The staff position in the Foundation, PASTIC & PMNH during the period is as under.

PAKISTAN SCIENCE FOUNDATION

Sr.No.	Designation	Number
1.	Chairman	1
2.	Member (Science)	1
3.	Member (Finance)	1
4.	Secretary	1
5.	Chief Scientific Officer	1
6.	Principal Scientific Officer	1
7.	Senior Scientific Officers	3
8.	Science Promotion Officer	1
9.	Deputy Secretary	1
10.	Deputy Director (F&A)	1
11.	Administrative Officer	1
12.	Accounts Officer	1
13.	PS to Chairman	1
14.	Librarian	1
15.	Internal Audit Officer	1
16.	Scientific Officers	6
17.	Assistant Scientific Officer	1
18.	Accountant	1
19.	Caravan Incharge	1
20.	Graphic Artist	1
21.	Superintendent	1
22.	Assistant Research Officer	1
23.	PA to Chairman	1
24.	PA to Member (Finance)	1
25.	Supporting Staff	76
	Total	107

In addition to the whole-time Staff Members of the Foundation there are about 200 scientists and technologists in various universities and research organizations who are acting in an honorary capacity as reviewers of the research proposals and members of the Technological Committees or Principal Investigators of PSF Supported Projects.

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE

1989 - 90

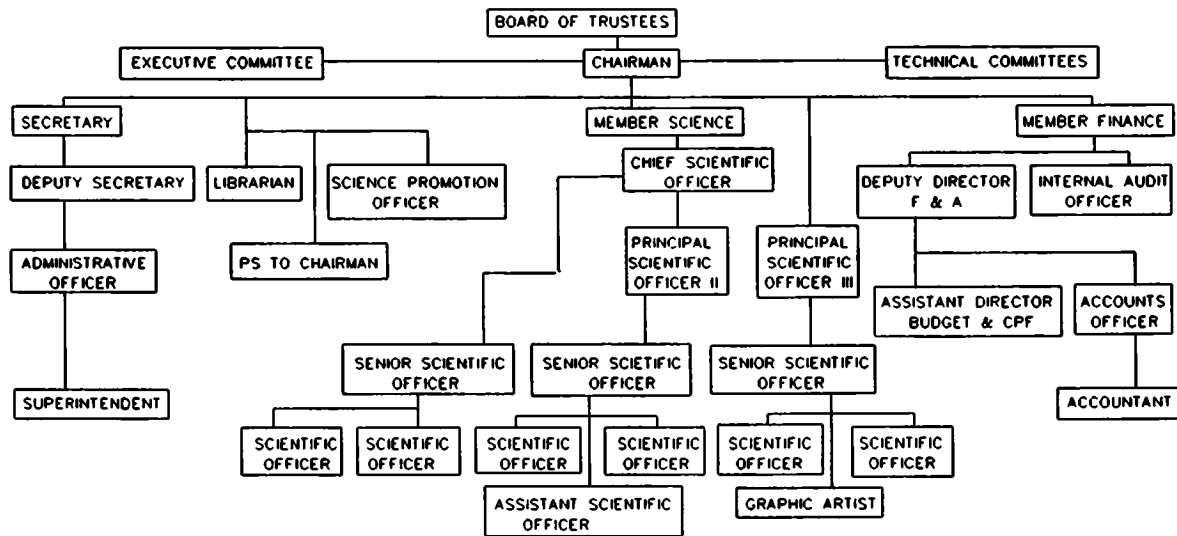
Sr.No.	Designation	Number
1.	Director General	1
2.	Deputy Director	1
3.	Senior Librarian	1
4.	Senior Information Officer	1
5.	Senior System Analyst	1
6.	Manager Reprographic Unit	1
7.	Senior Admn. Officer	1
8.	Officer Incharge (Karachi)	1
9.	Documentation Officer	1
10.	Accounts Officer	1
11.	Indexer	1
12.	Abstractor	1
13.	Bibliographic Officers	2
14.	Admn Officer (Karachi)1	1
15.	Officer Incharge (Peshawar)	1
16.	Officer Incharge (Lahore)	1
17.	Patent Officer	1
18.	Photographic Officer	1
19.	Cataloguer/Classifier	3
20.	Asstt. Accounts Officer	1
21.	Asstt. Documentation Officer (Lahore)	1
22.	Supdt. (Documentation)	1
23.	Supdt. (Admn.)	1
24.	Asstt Programmers	4
25.	Senior Plate Maker	1
26.	PA to D.G.	1
27.	Supporting staff	91
Total:-		123

PAKISTAN MUSEUM OF NATURAL HISTORY ISLAMABAD IN POSITION STRENGTH IN 1989-90

S.No.	Designation	Number
1.	Director General	1
2.	Directors	2
3.	Curator	Nil
4.	Associate Curators	6
5.	Research Associates	22
6.	Product Designer	1

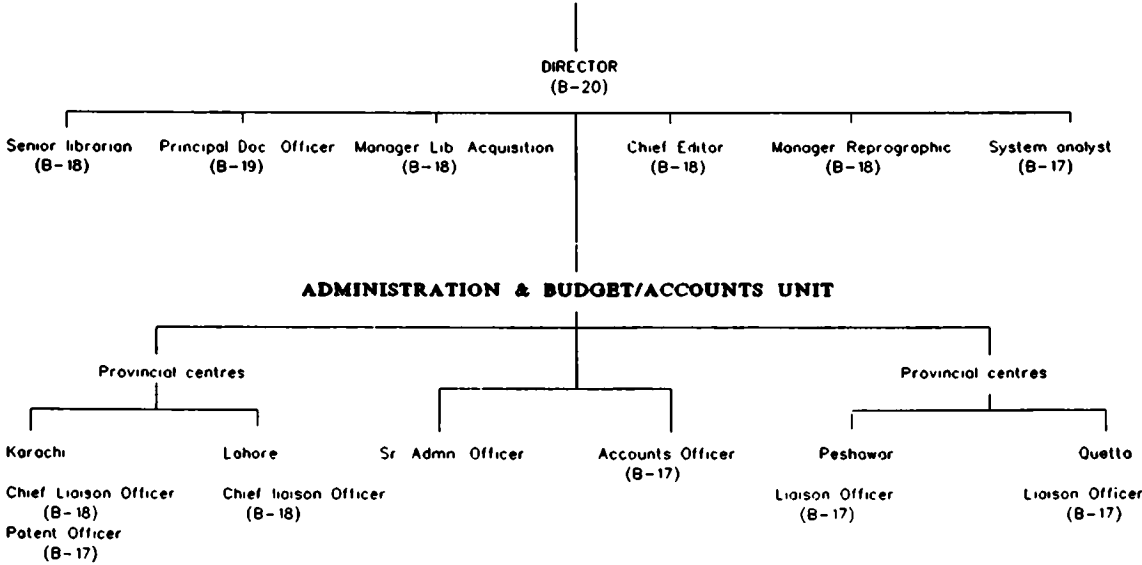
S.No.	Designation	Number
7.	Administrative Officer	1
8.	Accounts Officer	1
9.	Librarian	Nil
10.	Artist	1
11.	Taxidermists	2
12.	Teacher Guide	1
13.	Superintendent	Nil
14.	Accountant	1
15.	Supporting Staff	82
Total		121

**PAKISTAN SCIENCE FOUNDATION
ORGANIZATIONAL CHART**



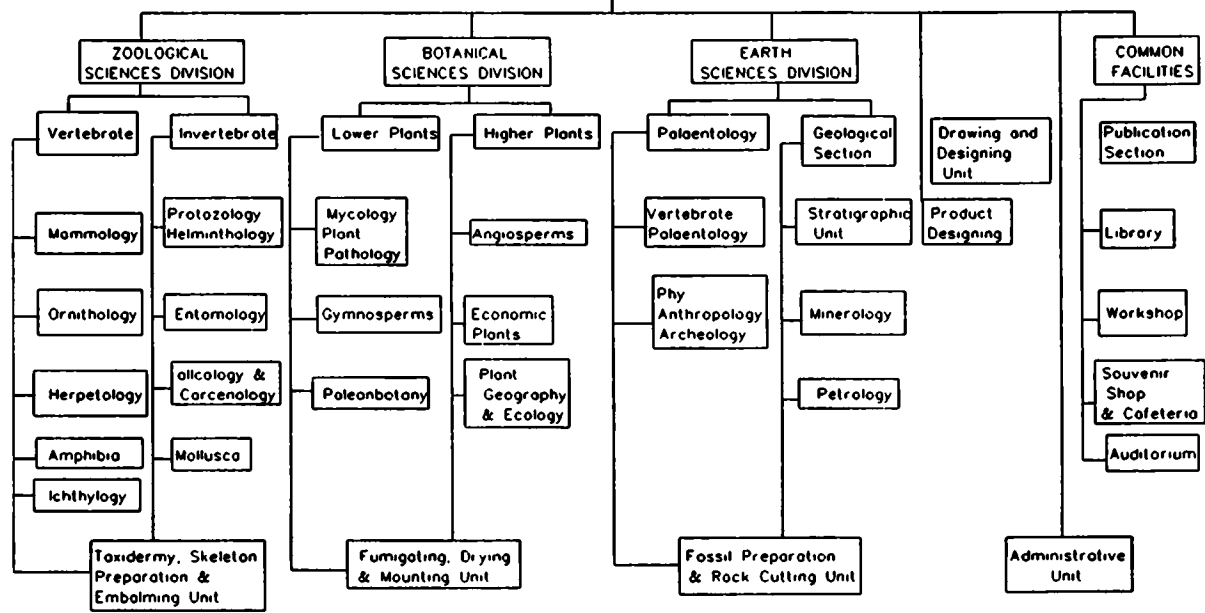
ORGANIZATION CHART

**PAKISTAN SCIENCE FOUNDATION
PAKISTAN SCIENTIFIC & TECHNOLOGICAL INFORMATION CENTRE
(PASTIC)
ISLAMABAD**



ORGANIZATIONAL STRUCTURE

PAKISTAN MUSEUM OF NATURAL HISTORY



CHAPTER-3

AUDITORS REPORT

The reports of the Auditors, appointed by the Foundation in consultation with the Auditor General of Pakistan are reproduced with respect to Pakistan Science Foundation and its subsidiary organizations, Pakistan Museum of Natural History and Pakistan Scientific and Technological Information Centre.

The names and addresses of the Auditors are:

Pakistan Science Foundation

Akbar & Co. Chartered Accountants,
Amin Building,
65, Shahrah-e-Quaid-i-Azam, Lahore.

Pakistan Museum of Natural History

Hussain Choudhory & Co.
Chartered Accountants,
Cooperative Insurance Building,
53/8, Haider Road,
Rawalpindi

Pakistan Scientific & Technological
Information Centre

Taseer Hadi
Khalid & Co.,
Chartered Accountants,
6th Floor, State Life Building No.5,
Blue Area, Islamabad.

AKBAR & COMPANY

CHARTERED ACCOUNTANTS

AUDITOR'S REPORT

We have examined the annexed Balance Sheet of PAKISTAN SCIENCE FOUNDATION as at June 30, 1990 and the annexed Receipts and Expenditure Account for the year ended June 30, 1990 and report that:-

- a) We have obtained all the information and explanations we required:
- b) Such Balance Sheet exhibits a true and correct view of the state of the Foundation's affairs according to the best of our information and explanations given to us and as shown by the books of the Foundation;
- c) The receipts of the Foundation during the year ended June 30, 1990 comprise of grants received from the Federal Government. We are satisfied that grant so received has been utilized for the objects for which it was made within the specified time limit and that there was no unspent balance except for expenses incurred but not paid upto June 30, 1990. We are also satisfied of the disbursements made from the grant.

AKBAR AND COMPANY
CHARTERED ACCOUNTANTS

LAHORE;65-SHAHRAH-E-QUAID-E-AZAM
DATE: 21 MAR 1991

PAKISTAN SCIENCE FOUNDATION, ISLAMABAD.

BALANCE SHEET AS ON JUNE 30, 1990.

FUNDS AND LIABILITIES	NOTES	1990	1989	PROPERTY AND ASSETS	NOTES	1990	1989
				FIXED ASSETS (As per Schedule Annexed)			
GENERAL FUND	2	6,433,050	6,433,335	At cost		8,055,726	7,785,561
				Less: Accumulated depreciation		2,654,616	2,249,080
RESEARCH SUPORT GRANT	3	21,930,301	22,019,746			5,401,110	5,536,481
CURRENT LIABILITIES	4	81,305	99,954	RESEARCH PROJECTS IN PROGRESS	5	21,930,301	22,019,746
				CURRENT ASSETS:			
				Accounts receivable	6	85,000	40,000
				Advances, deposits and prepayments	7	728,300	705,480
				Cash and Bank balances	8	299,945	251,328
RUPEES:		28,444,656	28,553,035	RUPEESS:		28,444,656	28,553,035

NOTES: Notes annexed form an integral part of these accounts.

LAHROE: 65 - SHAHRAH-E-QUAID-E-AZAM:

CHAIRMAN

TRUSTEE

TRUSTEE

AKBAR AND COMPANY

DATE: 21 MAR 1991

CHARTERED ACCOUNTANTS

PAKISTAN SCIENCE FOUNDATION ISLAMABAD

RECEIPTS AND EXPENDITURE FOR THE YEAR ENDED JUNE 30, 1990

EXPENDITURE	NOTES	1990	1989
Grants	9	5,615,080	5,384,214
Development grant	10	2,183,352	3,022,000
Travel grant for Scientific surveys	11	162,230	241,023
Other functions	12	1,625,505	1,396,904
Administrative expenses	13	6,934,470	6,919,866
		16,520,637	16,964,007
INCOME			
Miscellaneous		-	-
Net expenditure for the year transferred to General Fund		16,520,637	16,964,007

PAKISTAN SCIENCE FOUNDATION, ISLAMABAD.

SCHEDULE OF FIXED ASSETS AS ON JUNE 30, 1990

PARTICULARS	C O S T			RATE %	D E P R E C I A T I O N			Written Down value as on June 30, 1990
	As on July 1, 1989	Additions	As on June 30, 1990		As on July 1, 1989	For the Year	As on June 30, 1990	
Lease hold land	3,013,919	-	3,013,919	-	-	-	-	3,013,919
Furniture and Fixture	692,967	7,480	700,447	6	236,701	27,825	264,526	435,921
Office equipment	827,176	241,225	1,068,401	15	508,209	84,029	592,238	476,163
Air Conditioner	194,974	-	194,974	15	126,421	10,283	136,704	58,270
Motor Vehicle	1,876,490	-	1,876,490	20	929,484	189,401	1,118,885	757,605
Science Equipment	969,833	-	969,833	15	406,589	84,487	491,076	478,757
Library Books and Films	209,522	21,460	230,982	5	41,069	9,496	50,565	180,417
Bicycle	680	-	680	20	607	15	622	58
	<u>7,785,561</u>	<u>270,165</u>	<u>8,055,726</u>		<u>2,249,080</u>	<u>405,536</u>	<u>2,654,616</u>	<u>5,401,110</u>
1989:	<u>7,458,175</u>	<u>327,386</u>	<u>7,785,561</u>		<u>1,806,540</u>	<u>442,540</u>	<u>2,249,080</u>	<u>5,536,481</u>

PAKISTAN SCIENCE FOUNDATION, ISLAMABAD

NOTES TO THE ACCOUNTS AS ON JUNE 30, 1990

1. ACCOUNTING POLICIES

The principal accounting policies which have been adopted in the preparation of Foundation's accounts are as follows:-

A GRANT RECEIVED

Grant from the Government of Pakistan has been accounted for on receipt basis;

B RESEARCH SUPPORT GRANT

Research support grant has been accounted for on payment basis;

C FIXED ASSETS

1. Fixed assets have been valued at cost less accumulated depreciation except lease hold land which is valued at cost;
2. Depreciation on fixed assets has been charged on reducing balance method.

D. GENERAL

Figures have been rounded off to the nearest rupee.

2. GENERAL FUND

Movement in the accounts during the year is as follows:-

Balance as on July 1,	6,433,335	6,17,342
Add: Grant received from Government of Pakistan during the year		
Non-development grant	14,337,000	14,088,000
Development Grant	2,183,352	3,022,000
	22,953,687	23,397,342
Less: Expenditure during the year	16,520,637	16,964,007
	6,433,050	6,433,335

3. RESEARCH SUPPORT GRANT

3.1. The made up is as under:-		
Balance as on July 1,	22,019,746	21,808,493
Add: disbursed during the year	3.2 4,535,824	4,625,320
	26,555,570	26,433,813
Less: Projects completed during the year	3.3 4,625,269	4,414,067
	21,930,301	22,019,746

3.2 In accordance with principle out lined in charter grants aggregating Rs.4,535,824 have been paid by the Foundation during the year for construction of various approved Scientific Research Projects as detailed below:-

Medical science	12,001	339,776
Chemical Sciences	1,420,820	1,687,395
Agricultural Sciences	377,350	252,472
Biological Sciences	914,279	1,041,975
Earth Sciences	651,940	361,05
Environmental Sciences	200	200
Engineering Sciences	121,710	123,163
Physical Sciences	773,885	710,934
Institutional Support	55,000	90,000
Board Committee meeting	35,934	17,500
Math & Computer Sciences	172,709	-
	<u>4,535,824</u>	<u>4,625,320</u>

3 3 The projects which have been completed during the year are as follows:-

Agricultural Sciences	402,221	502,374
Biological Sciences	815,289	661,027
Chemical Sciences	1,272,940	1,477,585
Engineering Sciences	124,741	147,899
Environmental Sciences	-	252,854
Medical Sciences	40,395	1,372,328
Earth Sciences	888,078	-
Mathematical Sciences	22,156	-
Physical Sciences	1059,449	-
	<u>4,625,269</u>	<u>4,414,067</u>

4. CURRENT LIABILITIES

A	Audit fee	14,600	2,100
	Expenses payable	41,909	43,044
	Payable to contractors	24,796	54,810
		<u>81,305</u>	<u>99,954</u>

Expenses Payable represent the amount of telephone, water and gas expenses amounting to Rs.36,049, 5,700 and 160 respectively.

5. RESEARCH PROJECTS IN PROGRESS

This represents the expenditure incurred on various research projects which appears contra on the liability side under head "Research Support Grant."

6. ACCOUNTS RECEIVABLE:

UNESCO Coupons	<u>85,000</u>	<u>40,000</u>
	85,000	40,000

7. ADVANCES, DEPOSTS AND PREPAYMENTS:

The made up is as under :-

Advance to staff	49,800	11,200
Deposits	5,500	5,500
Advance Rent	673,000	688,780
	<u>728,300</u>	<u>705,480</u>

8. CASH AND BANK BALANCES:

Cash in hand	28,516	29,494
UNESCO Coupons	246,630	167,024
National Bank of Pakistan Account No.52	24,799	54,810
	<u>299,945</u>	<u>251,328</u>

9. GRANTS:

Research support	4,535,824	4,625,320
Scientific Societies and Professional Bodies	644,500	450,000
Scientific Conferences Meetings and Seminars	434,756	308,894
	<u>5,615,080</u>	<u>5,384,214</u>

10. DEVELOPMENT GRANT:

This represents the grants in aid received from AID of United States National Science Foundation of America Project PL-480 through Government of Pakistan and has been paid to the following:-

Chromosom	300,000	383,000
Science Caravan	900,001	2,639,000
Bisbenzy Lesoquinoline alkaloids	83,351	-
Construction building (P.S F.)	900,000	-
	<u>2,183,352</u>	<u>3,022,000</u>

11. TRAVEL GRANT FOR SCIENTIFIC SURVEY:

Visit of Scientists and Technologists	162,230	241,023
---------------------------------------	---------	---------

12. OTHER FUNCTIONS:

Science Centre and Hebraria	910,068	650,565
Information and Documentation	118,767	15,033
Awards Prizes and Fellowships	67,000	21,360
International Liaison	172,507	57,622
Collection of Statistics	-	39,217
Science Promotion activities	345,521	587,305
Scientists Pool	11,642	25,802
	<u>1,625,505</u>	<u>1,396,904</u>

13. ADMINISTRATIVE EXPENSE

Salaries and other benefits	3,905,930	3,615,467
Travelling expenses	155,588	96,486

Office rent	1,406,731	1,730,578
Electricity, Gas and Water	96,786	115,963
Postage, Telegram and Telephone	386,956	391,110
Printing and Stationery	70,010	83,031
Vehicle running and maintenance	290,610	253,248
News papers and periodicals	12,500	21,865
Liveries and Uniform	2,210	600
Entertainment	20,156	23,598
Repair and maintenance	47,183	49,711
Miscellaneous	13,580	63,161
Audit Fee	12,500	12,500
Advertisement	86,244	17,948
Bank charges	-	-
Depreciation	405,536	442,540
Ceremony expenses	22,000	-
	<u>6,934,470</u>	<u>6,919,866</u>

In the end we convey our thanks for the cooperation extended to us due to which we were in a position to complete the job assigned to us.

AKBAR AND COMPANY
CHARTERED ACCOUNTANTS

LAHORE:65 SHAHARAH-E-QUAID-E-AZAM
DATE:21 MAR 1991

PAKISTAN MUSEUM OF NATURAL HISTORY ISLAMABAD
RECEIPTS AND PAYMENTS ACCOUNT FOR THE YEAR ENDED 30TH JUNE' 1990
C.D. ACCOUNT NO. 70 U.B.L

RECEIPTS	AMOUNT	TOTAL	PAYMENTS	AMOUNT	TOTAL
	(Rs)	(Rs)		(Rs)	(Rs)
OPENING BALANCE			PAYMENTS DURING THE YEAR		
Cash at United Bank	30,601	30,601	Vehicle Repairs	4,175	
RECEIPTS DURING THE YEAR			Import License Fee	2,674	
C.P.F Loans from P.S.F	58,088		Marine Insurance	2,927	
P.S.F. Projects	122,615		T.A/D.A Bills	2,813	
Insurance claim	8,741		Stationery and Consumable Store	4,250	
Miscellaneous receipts	5,600	195,044	Bank charges	1	
			Uniform and Liveries for Drivers	1,250	
			Electricity Bills	7,983	26,073
			PAYMENTS ON BEHALF OF P.S.F.		
			C.P.F. Loans	58,088	
			P.S.F. Projects	87,615	145,703
			CLOSING BALANCE		
		225,645	Cash at united Bank	53,869	53,869
					225,645

NOTE: Receipts and Payment
Account of grant account is audited seperately.
Figures have been rounded off to nearest rupee.

ADMINISTRATIVE OFFICER

ACCOUNTS OFFICER

AUDITORS' REPORT

We have examined the Receipts and Payments Account of "PAKISTAN MUSEUM OF NATURAL HISTORY ISLAMABAD C.D. ACCOUNT NO.70 U.B.L" for the year ended 30.6.1990 and to report that according to the best of our information and explanations given to us, we have found the same to be in order, in accordance with the books of accounts produced to us

RECEIPTS AND PAYMENTS ACCOUNT (NOT DEVELOPMENT) FOR THE YEAR ENDED 30-06-90

RECEIPTS	AMOUNT	TOTAL	PAYMENTS	AMOUNT	TOTAL
	(Rs.)	(Rs)		(Rs.)	(Rs.)
OPENING BALANCE			PAYMENTS DURING THE YEAR		
Cash in hand	9,754	9,754	Salaries and allowances	3,079,909	
			Office building rent	470,576	
RECEIPTS DURING THE YEAR			Rent of residential accommodation	411,590	
Grants	4,988,00	4,988,000	Entertainment	1,972	
			Newspapers and periodicals	10,975	
			Telephone	124,888	
			Electric, Gas and Water charges	163,955	
			Advertisement	11,918	
			Postage and Telegram	2,789	
			Medical charges	245,423	
			Audit fee	4,000	
			Travelling expenses	38,387	
			Consumable store and stationery	107,415	
			POL repair and maintenance of vehicle	38,118	
			Repair and Maintenance of office equipment	19,345	
			Overtime	25,098	
			C.P.F Contribution	206,468	
			Group life insurance contribution	8,639	
			Office equipment	2,125	
			Furniture and fixture	2,200	
			Uniform and liveries	1,520	
			Ground rent to CDA	6,050	
			Miscellaneous	10,186	4,993,546
			CLOSING BALANCE		
			Cash in hand	4,208	4,208
AUDITORS' REPORT		<u>4,997,754</u>			<u>4,997,754</u>

NOTE: Figures have been rounded off to nearest rupees and transaction through UBL on behalf of PSF is audited separately.

We have examined the Receipts & Payments Account (NON DEVELOPMENT) OF "PAKISTAN MUSEUM OF NATURALHISTORY" for the year ended 30/6/90 and to report that according to the best of our information and explanations given to us, we have found the same to be in order, in accordance with the books of accounts produced to us. We are satisfied that the amount of grant shown in the statement of account has been spent on the objects for which it was made with in the specified limit. We have also satisfied ourselves about the propriety of disbursement made from the grant.

**RECEIPTS AND PAYMENTS ACCOUNT (DEVELOPMENT) FOR THE YEAR
ENDED 30TH JUNE' 90**

RECEIPTS	1990	1989	PAYMENTS	1990	1989
	(Rs)	(Rs)		(Rs)	(Rs)
OPENING BALANCES			PAYMENTS DURING THE YEAR		
Cash in hand	149	-	Purchase of vehicle	-	188,500
RECEIPTS DURING THE YEAR			Laboratory Equipments	163,747	167,690
Development Grants	3,500,000	4,511,000	Books and Journals	8,494	73,647
Foreign Exchange Grant (For import of Scientific Equipment)	1,500,000	-	Advance to CDA for construction of Museum	2,650,000	2,059,937
	5,000,000	4,511,000	Consultants' fee	-	1,327,994
			Pay and allowances	594,324	564,446
			Petrol, Oil and Lubricant	41,305	67,933
			Insurance premium vehicle	18,794	20,826
			Display Centre	23,249	39,878
			EXPENSES AGAINST FOREIGN GRANT		
			L.C. Margin	1,500,000	-
				4,999,913	4,510,851
			CLOSING BALANCES		
			Cash in hand	236	149
	<u>5,000,149</u>	<u>4,511,000</u>		<u>5,000,149</u>	<u>4,511,000</u>

AMINISTRATIVE OFFICER

ACCOUNTS OFFICER

AUDITORS' REPORT

We have examined the Receipts and Payments Account of "PAKISTAN MUSEUM OF NATURLA HISTORY (DEVELOPMENT PROJECT)" for the year ended 30th June' 1990 and to report that according to the best of our information and explanations given to us, we have found the same to be in order, in accordance with the books of accounts produced to us. We are satisfied that the amount of grant shown in the statement of account has been spent on the objects for which it was made with the specilled limit. We have also satisfied ourselves about the propriety of disbursement made from the grant.

KPMG Taseer Hadi Khalid & Co

Chartered Accountants
6th Floor State Life Building
Blue Area Islamabad
P.O. Box 1323
Pakistan

Telephone 819261-2
Telefax (92-21) 2410943
Telex 24515 THK PK
Other Offices
Karachi Lahore.

Pakistan Science Foundation
P-13, Al-Markaz
F-7/2, Islamabad

7th August, 1991

I-577-91

Dear Sirs,

We refer to our letter of 26th August, 1990 referenced-I-605-90 and our meeting with Mr. Chohan and Mr. Nawaz of Pakistan Scientific and Technological Information Centre (PASTIC). We confirm that the following observations contained in our aforementioned letter have been clarified or subsequently rectified:

	Observation No.
Appendix -I	1.2,1.3,1.5,1.6,1.7,3.0
Appendix-II	1.4,202
Appendix-III	1.2,2.1,2.2
Appendix-V	1.1,1.2,1.3

Should you require any further clarification or information, please contact us.

Yours faithfully,

Taseer Hadi Khalid & Co.

KPMG Taseer Hadi Khalid & Co

Chartered Accountants

**6th Floor State Life Building
Blue Area, Islamabad
P.O Box 1323
Pakistan**

**Telephone 819261-2
Telefax (92-21) 2410943
Telex 24515 THK PK Cable Advisors
Other Offices
Karachi Lahore.**

**Pakistan Science Foundation
P-13, Al-Markaz,
F-7/2, Islamabad**

26th August, 1990

I-605-90

Gentlemen,

We have examined the consolidated receipt and payment account of Pakistan Scientific & Technological Information Centre (PASTIC, Islamabad and its sub centres located at Karachi, Lahore, Quetta and Peshawar for the year ended 30th June, 1989.

Our examination was carried out in accordance with generally accepted auditing guidelines. Observations arising during the course of our examination in respect of each audit centre are appended to this letter as follows:-

Appendix-I	PASTIC, Islamabad
Appendix-II	Sub-Centre, Karachi
Appendix-III	Sub-Centre, Lahore
Appendix-IV	Sub-Centre, Quetta
Appendix-V	Sub-Centre, Peshawar

we shall be pleased to discuss the contents of this letter if it is so desired.

Should you require any further clarification or information, please contact us

Yours faithfully,

Taseer Hadi Khalid & Co.

KPMG - TASEER HADI KHALID & Co.

Chartered Accountants

APPENDIX-I

PASTIC-ISLAMABAD

I. NON-DEVELOPMENT EXPENSES:

- 1.1 We have been unable to reconcile assignment account-I, in the absence of bank statements. We were informed that the Bank does not issue any bank statements. We suggest that the bank should be instructed to send bank statement on a month to month basis and the account should be reconciled with the books.
- 1.2 Unreconciled differences of Rs.71,227 in payments include Rs.24,054 and Rs.47,173 against cash at bank and UNESCO/BLD coupons respectively. These have been written off since records relating to these balances are not available.
- 1.3 Agreements regarding grants received from Accountant General Pakistan Revenues were not provided to us to review the terms and conditions relating to these grants. We are, therefore, unable to comment whether the conditions, if any, in respect of these grants have been complied with.
- 1.4 The centre's assets are not insured. In addition there is no fidelity insurance. We suggest that all assets and cash be insured.
- 1.5 We noted that the Director General has been approving payment vouchers for sums exceeding Rs.5,000 whereas his authorised limit is restricted to Rs.5,000.

We feel that payment vouchers exceeding Rs.5,000 should be approved by the Chairman, PSF.

- 1.6 According to Rule 159 of the General Finance Rules Vol-1 and 5.45 of the Drawing and Disbursement Officers's (D.D.O 's) Book all stores should be physically verified at least once in a year. We, however, observed that stores have not been physically checked since 1985.
- 1.7 According to rule 148 of the General Finance Rules Vol.-II, all stores received should be examined, counted, measured or weighed, as the case may be, when delivery is taken. The officer responsible for stores should see that the quantities are correct and record a certificate to the effect that he has actually received the material and recorded them in the appropriate stock register

However, we noted that no such certificate is being prepared.
- 1.8 Rule 149 of the General Financial Rules Vol-II states that when material is issued from stock, acknowledgement of the indenter must be obtained before handing over the required item. We noted that this rule does not being followed at the centre and the indenter does not acknowledge receipt.

2. DOCUMENTATION SECTION

- 2.1 We were not provided with the basis for billings. We were therefore, unable to confirm the authenticity of the bills raised during the year. In addition, the bills are not prenumbered. We feel, that in order to avoid loss of revenue, bills should be prenumbered and raised according to predetermined rates.
- 2.2 We were not provided with the bank statements as well as the bank reconciliations in respect

of the National Bank of Pakistan Account No.056-9. The difference in balance between the bank book and the bank certificate has been written off. The write offs have not been verified by us in the absence of relevant information.

- 2.3 While checking documentation billing, we observed that receipts were not issued to customers in most cases for receipt against services provided to them.

We suggest that prenumbered receipts should be issued to all customers to maintain proper internal controls.

3. REPROGRAPHY SECTION

Differences of Rs.116,945 between the opening balances of the bank book and the closing balance in the audited accounts of 1988 have been written off.

The adjustment was made as the centre staff was not able to reconcile the differences.

The bank book balance of reprography, however, reconciles with the bank statements at the year end.

APPENDIX-II

KARACHI CENTRE

1. NON-DEVELOPMENT EXPENSES

- 1.1 According to the Federal Government Treasury Rule 77 (iv) and rule 6.27 of the Drawing and Disbursement Officer's (D.D.O's) Book, the D.D.O. should certify the physical verification of cash recorded in the cash book. In contravention to the above rule, the D.D.O. has not been certifying the physical verification of cash.

- 1.2 It was observed that the centre was not preparing reconciliations with bank as well as of amounts received from PASTIC National Centre and Pakistan Science Foundation, as required under the rules.

We, therefore, suggest that reconciliations should be carried out to ensure that all transactions are recorded.

- 1.3 According to Rule 159 of the General Financial Rules Vol-I and 5.45 of the Drawing and Disbursement Officer's (D.D.O.'s) Book all stores should be physically verified at least once in a year. We, however, observed that stores have not been physically checked since 1985.

- 1.4 According to rule 76 (vi) of the Federal Government Treasury Rules and rule 6.28 of the Drawing Disbursement Officer's (D.D.O.'s) Book, overwriting in the cash book is strictly prohibited, or otherwise should be attested/initialled by the D.D.O./Officer Incharge, as required by the rules.

We observed that a number of cuttings and changes were made in the cash book, which were not attested/initialled by the D.D.O./Officer incharge, as required by the rules.

2. DOCUMENTATION SECTION

- 2.1 Differences of Rs.885 between the bank book and the bank statement remained unreconciled at the year end. These unreconciled differences were written off.
- 2.2 The British Library Document's (BLDS's) Register was not provided to us, so we were unable to verify the transactions during the year in respect of BLD's.
- 2.3 We were not provided with the basis for billings. We were, therefore, unable to confirm the authenticity of the bills raised during the year. In addition, the bills are not prenumbered.

We feel, that in order to avoid loss of revenue, bills should be prenumbered and raised according to predetermined rates.

APPENDIX-III

LAHORE CENTRE

1. NON-DEVELOPMENT EXPENSES

- 1.1 According to the Federal Government Treasury Rule 77 (iv) and rule 6.28 of the Drawing and Disbursement Officer's (D.D.O.'s) Book, the D.D.O. should certify the physical verification of cash recorded in the cash book. In contravention to the above rule, the D.D.O. has not been certifying the physical verification of cash.
- 1.2 According to rule 76 (vi) of the Federal Government Trasury Rules and rule 6.78 of the Drawing and Disbursement Officer's (D.D.O.'s) Book, overwriting in the cash book is strictly prohibited, or otherwise should be attested/initialled.

We observed that a number of cuttings and changes were made in the cash book, which were not attested/initialled by the D.D.O./Officer Incharge, as required by the rules.

- 1.3 According to Rule 159 of the General Financial Rules Vol-I and 5.45 of the Drawing and Disbursement Officer's (D.D.O.'s) Book all stores should be physically verified at least once in a year. We, however, observed that stores have not been physically checked since 1985.

2. DOCUMENTATION SECTION

- 2.1 We were not provided with the bank statements of account number 548, in the absence of which we were unable to reconcile bank balances.
- 2.2 British Library Document's (B.L.D.'s) Register was not provided to us, therefore, we were unable to check the B.L.D's related transactions during the year.
- 2.3 We were not provided with the basis for billings. We were, therefore, unable to confirm the authenticity of the bills raised during the year. In addition, the bills are not prenumbered. We feel that in order to avoid loss of renvenue, bills should be prenumbered and raised according to predetermined rates.

APPENDIX-IV

QUETTA CENTRE

1. NON-DEVELOPMENT EXPENSES

- 1.1 Bank statements for National Bank of Pakistan, Account No.5464 from 15.4.1989 onwards were not provided to us, we, therefore, were unable to reconcile the year end balance.
- 1.2 It was observed that the centre was not preparing reconciliations with bank as well as of amounts received from PASTIC National Centre and Pakistan Science Foundation, as required under the rules.

We, therefore, suggest that reconciliations should be carried out to ensure that all transactions are recorded.

- 1.3 We observed that vouchers were prepared on a plain piece of paper. In addition, no approval was shown to us for any expense incurred during the year.
- 1.4 An amount of Rs.51,000 was sent to Quetta Centre by PASTIC National Centre as house rent of employees. This transaction was neither booked as a receipt nor was any payment recorded

there against in the cash book.

- 1.5 We observed that a number of cuttings and changes were made in the cash book, which not attested/initialled by the D.D.O./Officer incharge, as required by the rules.

According to rule 76 (vi) of the Federal Government Treasury Rules and rule 6.28 of the Drawing and Disbursement Officer's (D.D.O.'s) Book, overwriting in the cash book is strictly prohibited, or otherwise should be attested/initialled by the D.D.O./Officer Incharge, as required by the rules.

- 1.6 We observed that Mr. Shams-ul-Haq, Photo Assistant, has been drawing medical allowance @ Rs.200.00 per month whereas he is entitled to an allowance of Rs.100 per month.

We were not given any satisfactory explanation for this difference.

- 1.7 We noted that the following staff advances have been outstanding for a considerable length of time.

Name	Amount(Rupees)	Outstanding since
Mr.Ayatullah Durrani Officer-incharge	3,000	February, 1989
Mr.Shamsiul-Haq Photo Assistant	2,000	September, 1987

- 1.8 Deductions of C.P.Fund from the pay of staff has not been made at the prescribed rate of 12 1/2% of the pay and the same has also not been remitted to the Pakistan Science Foundation, contributory Provident Fund Account since August, 1987.

- 1.9 Deductions from salary on account of Benevolent Fund and Group Life Insurance from the staff have not been made according to the prescribed rates.

- 1.10 The British Library Document's (BLD's) Register was not provided to us, so we were unable to verify the transactions during the year in respect of BLD's.

APPENDIX v

PESHAWAR CENTRE

1 NON-DEVELOPMENT EXPENSES

- 1.1 The British Library Document's (BLD's) Register was not provided to us, so we were unable to verify the transactions during the year in respect of BLD's.

- 1.2 According to the Federal Government Treasury Rule 77 (iv) and rule 6.28 of the Drawing and Disbursement Officer's (D.D.O's) Book, the D.D.O. should certify the physical verification of cash recorded in the cash book. In contravention to the above rules, the D.D.O. has not been certifying the physical verification of cash.

- 1.3 According to rule 76 (vi) of the Federal Government Treasury Rules and rule 6.28 of the Drawing and Disbursement Officer's (D.D.O's) Book, overwriting in the cash book is strictly prohibited, or otherwise should be attested/initialled.

We observed that a number of cuttings and changes were made in the cash book, which were not attested/initialled by the D.D.O./Officer-in-Charge, as required by the rules.

2. DOCUMENTATION SECTION

We were not provided with the basis for billings. We were, therefore, unable to confirm the authenticity of the bills raised during the year. In addition the bills are not prenumbered. We feel that in order to avoid loss of revenue, bills should be prenumbered and raised according to predetermined rates.

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE

**CONSOLIDATED RECEIPT AND PAYMENT ACCOUNT
FOR THE YEAR ENDED 30TH JUNE, 1989**

	ISLAMABAD	LAHORE	KARACHI	QUETTA	PESHAWAR	TOTAL	
	(Rs.)	(Rs.)	(Rs.)	(Rs.)	(Rs.)	1989 Rs.	1988 Rs.
RECEIPTS							
OPENING BALANCES							
Cash in had	1,473	500	1,500	-	-	3,473	2,094
Cash at bank	24,054	39,983	19,048	17,076	81	100,242	396,233
UNESCO coupons in hand	47,173	-	-	-	-	47,173	47,173
	<u>72,700</u>	<u>40,483</u>	<u>20,548</u>	<u>17,076</u>	<u>81</u>	<u>150,888</u>	<u>445,500</u>
GRANTS							
From A G.P.R.	5,985,000	-	-	-	-	5,985,000	4,964,000
From Pakistan Science Foundation	-	9,840	15,883	3,000	5,730	34,453	16,215
From PASTIC Islamabad Previous year's amount received during the year	-	241,201	599,271	200,237	212,499	-	-
Other receipts	-	1,040	22,910	300	1,154	25,404	50,577
	<u>6,057,700</u>	<u>292,564</u>	<u>658,612</u>	<u>220,613</u>	<u>234,280</u>	<u>6,210,561</u>	<u>5,476,292</u>

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE

**CONSOLIDATED RECEIPT AND PAYMENT ACCOUNT
FOR THE YEAR ENDED 30TH JUNE, 1989**

PAYMENTS	ISLAMABAD	LAHORE	KARACHI	QUETTA	PEHAWAR	TOTAL	
	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	1989 (Rs.)	1988 (Rs.)
Salaries and allowances	2,184,112	181,241	437,372	143,020	146,836	3,092,681	3,088,678
Gratuity	142,415	-	-	-	-	142,415	150,013
Printing, stationery and consumable stores	11,612	3,283	3,052	1,700	2,189	21,836	46,316
Books and publications	2,944	953	180	224	719	5,020	13,398
Entertainment	4,511	247	-	1,200	1,004	6,962	6,167
Postage, telegram, telephone and telex charges	32,937	5,505	34,363	-	5,885	78,690	107,727
Electricity, water and sui-gas charges	188,736	5,071	16,134	-	2,657	212,598	197,067
Vehicle running expenses	67,736	8,404	18,945	-	7,783	102,808	71,159
Rent, rates and taxes	346,413	-	50,000	51,060	48,000	495,473	196,577
Legal and professional charges	-	-	5,000	-	-	5,000	-
Furniture and fixtures	-	-	-	-	-	-	1,100
Travelling and conveyance	9,282	2,493	6,276	11,000	1,803	30,854	21,176
Medical charges	265,430	12,598	53,556	-	-	331,584	219,172
Repair and maintenance of vehicles	-	-	-	7,500	7,907	15,407	5,231
Repair and maintenance of equipments	25,733	15,350	2,161	500	-	43,744	71,838
Repair and maintenance of buildings	18,428	-	307	350	-	19,085	20,574
Advances	4,800	8,040	-	3,000	5,730	21,570	11,970
Purchase of equipments	-	-	-	-	-	-	8,500
Social welfare fund	15,000	200	2,475	300	525	20,100	11,360
Technological Information Pilot Services (TIPS)	1,078,214	-	-	-	-	1,078,214	600,000
Balance carried forward	4,398,303	245,085	629,821	219,854	231,038	5,724,101	4,848,088

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE

**CONSOLIDATED RECEIPT AND PAYMENT ACCOUNT
FOR THE YEAR ENDED 30TH JUNE, 1989**

	ISLAMABAD	LAHORE	KARACHI	QUETTA	PESHAWAR	TOTAL	
	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	1989 Rs.	1988 Rs.
Balance brought forward	4,398,303	245,085	629,821	219,854	231,038	5,724,101	4,848,088
Remittances:							
Quetta University	-	-	-	-	-	-	10,000
In transit	73,083	-	-	-	-	73,083	14,756
Sub-centres	1,253,208	-	-	-	-	-	-
Reprography expenses	76,412	-	-	-	-	76,412	130,002
Pakistan Science Foundation							
Expenditure	-	-	-	-	-	-	14,858
Refund to PSF	-	-	-	-	-	-	100,000
Purchase of UNESCO/BLD coupons	171,825	-	-	-	-	171,825	183,338
Miscellaneous	12,142	1,353	6,550	4	938	20,987	23,782
Unreconciled difference	71,227	70	-	-	-	71,297	580
Closing balance	6,056,200	246,508	636,371	219,858	231,976	6,137,705	5,325,404
Cash in hand	1,500	500	1,500	-	-	3,500	3,473
Cash at bank	-	45,556	20,741	755	2,304	69,356	100,242
UNESCO/BLD coupons in hand	-	-	-	-	-	-	47,173
	1,500	46,056	22,241	755	2,304	72,856	150,888
GRAND TOTAL:	6,057,700	292,564	658,612	220,613	234,280	6,210,561	5,476,292

PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE
CONSOLIDATED GOVERNMENT RECEIPT AND PAYMENT ACCOUNT
FOR THE YEAR ENDED 30TH JUNE, 1989

RECEIPTS	ISLAMABAD	LAHORE	KARACHI	QUETTA	PESHAWAR	TOTAL	
	(Rs)	(Rs)	(Rs)	(Rs)	(Rs)	1989 Rs.	1988 Rs.
Opening balance							
Cash in hand	10	-	-	-	-	10	10
Cash at bank	582,647	130	86	-	562	583,425	525,478
	<u>582,657</u>	<u>130</u>	<u>86</u>	<u>-</u>	<u>562</u>	<u>583,435</u>	<u>525,488</u>
Receipts							
Documentation	38,284	26,314	30,328	-	10,834	105,760	843,644
Reprography	300,730	-	-	-	-	300,730	32,479
	<u>339,014</u>	<u>26,314</u>	<u>30,328</u>	<u>-</u>	<u>10,834</u>	<u>406,490</u>	<u>876,123</u>
	<u>921,671</u>	<u>26,314</u>	<u>30,414</u>	<u>-</u>	<u>11,396</u>	<u>989,925</u>	<u>1,401,611</u>
PAYMENTS							
Reprography expenses	663,764	-	-	-	-	663,764	703,370
Bank charges	25	15	-	-	-	40	48
Transfer in Government treasury account	-	17,500	26,500	-	11,380	55,380	114,758
Unreconciled difference:							
Reprography	116,955	-	-	-	-	116,955	-
Documentation	-	-	885	-	-	885	-
	<u>780,744</u>	<u>17,515</u>	<u>27,385</u>	<u>-</u>	<u>11,380</u>	<u>837,024</u>	<u>818,176</u>
Closing balance							
Cash in hand	-	-	-	-	-	-	10
Cash with banks							
Reprography	102,643	-	-	-	-	102,643	583,425
Documentation	38,284	8,929	3,029	-	16	50,258	-
	<u>140,927</u>	<u>8,929</u>	<u>3,029</u>	<u>-</u>	<u>16</u>	<u>152,901</u>	<u>583,435</u>
	<u>921,671</u>	<u>26,444</u>	<u>30,414</u>	<u>-</u>	<u>11,396</u>	<u>989,925</u>	<u>1,401,611</u>

PAKISTAN SCIENCE FOUNDATION ACT 1973

**National Assembly of Pakistan
Islamabad, the 2nd February, 1973**

The following Acts of the National assembly received the assent of the President on the 31st January, 1973 and hereby published for general information

Act No.III of 1973

An Act to provide for the establishment of the Pakistan Science Foundation.

Whereas it is expedient to provide for the establishment of the Pakistan Science Foundation and for matters ancillary thereto,

It is hereby enacted as follows:-

1. **SHORT TITLE, EXTENT AND COMMENCEMENT** (1) This Act may be called the Pakistan Science Foundation Act, 1973.
 - (2) It extends to the whole of Pakistan
 - (3) It shall come into force at once.
2. **DEFINITIONS** - In this Act, unless there is anything repugnant in the subject or context.
 - (a) 'Board' means the Board of Trustees of the Foundation;
 - (b) "Chairman: means the Chairman of the Foundation; and
 - (c) "Foundation" means the Pakistan Science Foundation established under this Act.
3. **ESTABLISHMENT OF THE FOUNDATION:** (1) As soon as may be after the commencement of this Act, the Federal Government may, by notification in the official Gazette, establish a Pakistan Science Foundation to promote and finance scientific activities having a bearing on the socio-economic needs of the country
 - (2) The Foundation shall be a body corporate by the name of the Pakistan Science Foundation, having perpetual succession and a common seal, with power, subject to the provision of this Act, to acquire, hold and dispose of property, both movable and immovable, and shall be the said name use and be used.
 - (3) The Head Office of the Foundation shall be at Islamabad
4. **FUNCTIONS OF THE FOUNDATION:** (1) The Foundation shall function as a financing agency to:-
 - (i) the establishment of comprehensive scientific and technological information and dissemination centres;
 - (ii) the promotion of basic and fundamental research in the universities and other institutions on scientific problems relevant to the socio-economic development of the country;
 - (iii) the utilization of the results of scientific and technological research including pilot plant studies to prove the technical and economic feasibility of processes found to be promising on a laboratory scale;

- (iv) the establishment of science centres, clubs, museums, herbaria and planetaria;
 - (v) the promotion of scientific societies, associations and academies engaged in spreading the cause of scientific knowledge in general or in the pursuit of a specific scientific discipline of technology in particular;
 - (vi) the organization of periodical science conferences, symposia and seminars;
 - (vii) the exchange of visit of scientists and technologists with other countries;
 - (viii) the grant of awards, prizes and fellowships to individuals engaged in developing processes, products and inventions of consequence to the economy of the country; and
 - (ix) special scientific surveys not undertaken by any other organization and collection of scientific statistics related to the scientific effort of the country.
- (2) The Foundation shall also;
- (i) review the progress of scientific research sponsored by it and evaluate the results of such research;
 - (ii) maintain a National Register of highly qualified and talented scientists of Pakistan including engineers and doctors, in or outside the country and to assist them, in collaboration with the concerned agencies in finding appropriate employment; and
 - (iii) establish liaison with similar bodies in other countries.
- (3) In the performance of its functions, the Foundation shall be guided on questions of policy by the instructions, if any, given to it by the Federal Government which shall be the sole judge as to whether a question is a question of policy.
5. **BOARD OF TRUSTEES:-**(1) The general direction, conduct and management of the affairs of the Foundation, including administration of its funds, shall vest in a Board of Trustees consisting of the following members namely:-
- Whole-time members
- (i) the Chairman
 - (ii) one eminent scientist;
 - (iii) the Director of Finance;
to be appointed by the President;
- Part-time members
- (iv) the Chairman of the National Science Council;
 - (v) four scientists to be nominated by the National Science Council; and
 - (vi) eleven eminent scientists to be nominated by the President
- (2) The remuneration and other terms and conditions of service of the Chairman and the two other whole-time members of the Board shall be such as may be determined by the President.
6. **CHAIRMAN OF THE BOARD-** The Chairman of the Board shall be the Chairman of the Foundation and shall be appointed for a term of three years from amongst the eminent scientists of the country having experience of research and scientific administration.
7. **TERM OF MEMBERS OF THE BOARD:-** The members of the Board, other than the ex-officio

member, shall hold office for a term of three years and shall be eligible for re-appointment or re-nomination, as the case may be.

8. **MEETING OF THE BOARD:-**(1) The meeting of the Board shall be held at least twice a year and shall be presided over by the Chairman or, in his absence, by its whole-time scientist member.
(2) All decisions at a meeting of the Board shall be taken by a majority of the votes of the members present and voting.
9. **QUORUM AT THE MEETING OF THE BOARD:-** To constitute a quorum at a meeting of the Board not less than nine members shall be present.
10. **EXECUTIVE COMMITTEE:-** There shall be an Executive Committee consisting of the Chairman and the two whole-time members of the Board.
11. **DELEGATION OF POWERS:-** The Board may, from time to time, delegate the Chairman or the Executive Committee such of its power and functions as it may consider necessary.
12. **ADHOC COMMITTEES:-** The Foundation may set up ad hoc committees consisting of university professors and other leading scientists and experts to scrutinize applications for financial assistance for carrying out scientific research submitted to the Foundation by the universities or other institutions or by individual scientific workers or groups of scientific workers and to review and evaluate the results of research sponsored by the Foundation.
13. **FUNDS:-** The funds of the Foundation shall consist of:-
 - (a) grants made by the Federal Government and the Provincial Governments;
 - (b) donation and endowments; and
 - (c) income from other sources.
14. **BUDGET:-** The Foundation shall cause to be prepared and approve a statement of its receipt and expenditure for each financial year.
15. **ACCOUNTS AND AUDIT:-** (1) The funds of the Foundation shall be kept in a personal ledger account of the Foundation with the State Bank of Pakistan or with any Branch of the National Bank of Pakistan acting as an agent of the State Bank.
(2) The accounts of the Foundation shall be maintained in such form and manner as the Auditor-General of Pakistan may determine in consultation with the Federal Government.
(3) The accounts of the Foundation shall be audited by one or more auditors who are chartered accountants within the meaning of the Chartered Accountants Ordinance, 1961 (X of 1961) and are appointed by the Foundation in consultation with the Auditor-General of Pakistan.
16. **APPOINTMENT OF OFFICERS AND SERVANTS:-** (1) The Foundation may appoint such officers and servants and engage such consultants or experts, as it may consider necessary for the efficient performance of its functions, on such terms and conditions as it may deem fit.
(2) In fixing the terms and conditions of service of its officers and servants, the Foundation shall, as nearly as may be, conform to the scales of pay, allowances and conditions of service applicable to the corresponding class of employees of the Federal Government.
17. **ANNUAL REPORTS:-**(1) the annual report of the Foundation which shall among other things, clearly bring out the benefits accruing to the nation as a result of the activities sponsored by the Foundation, shall be prepared by the Chairman and submitted through the Board to the Federal Government along with the audited accounts of the Foundation.

- (2) The annual report alongwith the audited accounts of the Foundation shall be laid before the National Assembly.
- 18. REGULATIONS:- The Foundation may make regulations for the efficient conduct of its affairs.
- 19. REPEAL:- The Pakistan Science Foundation Ordinance, 1972 (LII of 1972), is hereby repealed.

**MEMORANDUM OF UNDERSTANDING ON COLLABORATION
BETWEEN
PAKISTAN SCIENCE FOUNDATION
AND
ROYAL SOCIETY OF LONDON**

Recognizing the mutual benefit of scientific interchange and the convenience of set procedures for its administration, the Pakistan Science Foundation and the Royal Society of London, hereinafter called the Sides, conclude the following Memorandum of Understanding:

I. Scientific contacts

Both Sides will do all in their power to facilitate collaboration between specialists in the scientific disciplines within their mutual competence.

II Exchange visits

In each year commencing 1st April, the Sides will organise and finance visits in each direction by research scientists of postdoctoral or equivalent status in pure and applied fields in two categories:

- a) Study Visits:- Usually for short periods of from one to four weeks, to a total of four person-months on either Side, with the aim of visiting a number of laboratories or field study visits in the host country for discussions and liaison; and
- b) Fellowships:- Usually for longer periods to carry out research projects or learn new techniques predominantly in one laboratory or site but with provision for short subsidiary visits to others

IV. Selection and proposal of visitors

The sending Side will be responsible for selecting and nominating visitors from that country to the host Side: but the host Side may suggest that particular scientists or subjects should be considered by the sending Side, when the work to be undertaken in the host country relates to a joint project, or will be especially valuable in the furtherance of scientific collaboration.

Nominations will be made on standard forms of proposal as may be agreed by the Sides.

Nominations are to be forwarded to the host Side in sufficient time for at least three months notice to be given in each case. Not later than two months following receipt of a nomination, the receiving Side is to inform the sending Side as to the acceptability of the proposed visit, the suggestions for the programme should be sent as soon as possible for the visitor's information and approval; the sending Side should cable travel details at least a week in advance of the visitor's arrival.

Once a nominated scientist has been accepted for a visit, the receiving Side will take all appropriate steps to facilitate the issue of necessary visa/work or residence permit etc.

V. Attendance at meetings

Although the purpose of visits under Article II should not primarily be attendance at conference, etc., such attendance may be included within a visit if both Sides agree.

VI. **Joint projects**

Both Sides will encourage joint scientific research between laboratories in the two countries including the conclusion of inter- institutional agreements where this is necessary.

VII. **Medical treatment**

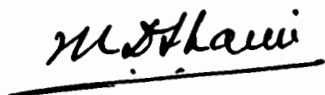
Emergency medical treatment will be available to visitors in accordance with the laws of the country concerned.

VIII. **validity of Agreement**

This Memorandum of Understanding shall enter into force upon signature and shall remain in force for a period of five years thereafter, unless terminated earlier by either Side. Notice shall be given at least 60 days prior to the desired termination date by notification in writing from one Side to the other.

In witness hereof, the undersigned, being duly authorized, have signed this Memorandum of Understanding.

Done at London, This 15th day of Sept. 1981



Pakistan Science Foundation



Royal Society of London

THE ROYAL SOCIETY

Financial arrangements for visits under the Memorandum of Understanding between the Royal Society of London and the Pakistan Science Foundation

Study Visits under Article II (a) will generally be on the basis of the sending Side paying international fares and the host Side local costs, whereas Fellowships under Article II (b) will be entirely at the expenses of the sending Side.

Study Visits

Accommodation

The host side will reserve and pay directly for the visitor's occupation of the room with use of bath or shower in a hotel, college, hostel or other suitable establishment for the period of the visit.

Maintenance

Additionally the visitor will be paid in advance an allowance of 12. p.d. in the United Kingdom and Pak Rs.250 in Pakistan for meals not included in the price of the accommodation and for incidental expenses (including bus and petty transport costs).

Travel

For other local travel visitors will be given pre-paid tickets or, where this is impracticable, such expenses will be reimbursed retrospectively.

Conference fees

At the request of the sending Side the host Side will pay the fees for attendance at meetings under Article V.

Accompanying dependents

Accompanying dependents will be at the expense of the visitors concerned. However, if requested in good time, the host Side may help be reserving economically priced double rooms, making extra provision for local travel, etc on the understanding that the extra cost will be repaid by the visitor.

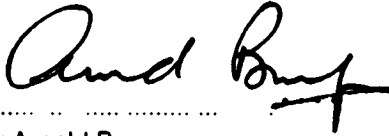
Fellowships


Although Fellowships under Article II (b) will be entirely at the expense of the sending Side, the host Side, if required, may help with accommodation by making inquiries and reservations on behalf of the sending Side, providing information on available, cost, etc , either to the sending Side, or directly to the visitor.

Done in London on 15 September 1981.

For the Royal Society of London

For the Pakistan Science Foundation

(Signed) 
Sir Arnold Burgen
(Title) Vice-President

(Signed) 
Dr. M. D. Shami
(Title) Chairman