



Pakistan  
Science  
Foundation  
ANNUAL REPORT  
1980  
81



# Pakistan Science Foundation

## ANNUAL REPORT

1980 - 81

**PAKISTAN SCIENCE FOUNDATION**

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**LETTER OF TRANSMITTAL**

**Islamabad**

**Dear Mr. Secretary**

I have the honour to enclose herewith the eighth Annual Report of the Pakistan Science Foundation for the Fiscal year 1980-81, 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,**

**Sd/-  
(Dr. M.D. SHAMI)  
Chairman  
Pakistan Science Foundation**

**Secretary,  
Ministry of Science & Technology,  
Government of Pakistan,  
ISLAMABAD.**

**PAKISTAN SCIENCE FOUNDATION**

***Chairman***

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

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**Not-Existent**

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## **LIST OF ABBREVIATIONS**

### ***Provinces:***

- B. Baluchistan**
- C. Centre**
- F. Frontier**
- P. Punjab**
- S. Sind**

### ***Sponsoring Institutions:***

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

**Disciplines:**

<b>AGR</b>	<b>Agricultural Sciences</b>
<b>BIO</b>	<b>Biological Sciences</b>
<b>CHEM</b>	<b>Chemical Sciences</b>
<b>EARTH</b>	<b>Earth Sciences</b>
<b>ENG</b>	<b>Engineering Sciences</b>
<b>ENVR</b>	<b>Environmental Sciences</b>
<b>MATH</b>	<b>Mathematics &amp; Computer Sciences</b>
<b>MED</b>	<b>Medical Sciences</b>
<b>OCEAN</b>	<b>Oceanography</b>
<b>PHY</b>	<b>Physical Sciences</b>



## INTRODUCTION

The Pakistan Science Foundation since its inception in 1973 under an Act of the National Assembly, has endeavoured within its limited resources, to strive for the promotion and progression of Science and Technology for the speedy socio-economic development of the nation. Its establishment as an alternate source of funding is a recognition of the vital importance of Science & Technology in the forward march of the nation to self reliance in solving the hard pressed needs in developing agriculture, engineering, medicine and energy resources.

The Foundation is also the fulfilment of a cherished desire of the scientific community in the country which has been working under difficult conditions. Some of the problems faced by it, are, shortage of qualified/trained manpower, dearth of upto date literature, non availability of most modern and sophisticated scientific equipment/apparatus, and the lack of interaction with the scientific community internationally. Non-appreciation by the Society, of the vital role of Science and Technology in national development has been quite discouraging. In order to help the Scientists/Technologists to overcome their difficulties as well as to create awareness among the masses regarding Science and Technology, an organization with sufficient authority and financial resources, such as the Pakistan Science Foundation was the need of the time.

The Pakistan Science Foundation was established on June 30, 1973 under the Pakistan Science Foundation Act III of 1973 (Annexure-I) as a financial agency for:-

- a)
  - 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 of national significance 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 development of learned bodies, 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) the organization of periodical science conferences, symposia and seminars;

- vii) the exchange of visits 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.
- b) The Foundation was also charged with the responsibility to:—
- i) review the progress of scientific research sponsored by the Foundation and evaluate the results of such research;
  - ii) maintain a National Register of citizens of Pakistan who are highly qualified and talented scientists, including engineers and doctors, in or outside Pakistan and to assist them, in collaboration with the agencies concerned, in finding, within Pakistan employment most suited to their genius, and
  - iii) cultivate liaison with similar bodies in other countries.

The achievements made by the Foundation during the performance of above statutory functions are described in the ensuing chapters.

## CHAPTER—I

## ACTIVITIES AND PROGRAMMES

The salient features of the progress made by the Foundation during 1980-81 in the discharge of the functions entrusted to it under the Charter are summarised below:

**I. ESTABLISHMENT OF SCIENTIFIC AND TECHNOLOGICAL INFORMATION AND DISSEMINATION CENTRE (PASTIC) AT ISLAMABAD:**

**i) PASTIC Permanent Building**

Necessary modification was brought in the structural drawings of the building after the soil investigation was done. Foundation work, construction of structural components of the basement and ground floor, casting and laying of the roof on both the basement and ground floor were completed.

**ii) Technical Assistance from UNCSTD**

In view of the paucity of the UNDP Funds, it was suggested by E.A.D. to submit the Revised PASTIC Project under the UN Special funds allocated by UN to UNCSTD. Accordingly, the Project of PASTIC was submitted to the Ministry of Science & Technology for onward transmission to UNDP for the consideration of the UNCSTD for obtaining foreign assistance for the first two years of the Project.

**iii) Series of Seminars**

**ON STRATEGY AND IMPORT OF INFORMATION SERVICES AND SYSTEMS ON SCIENTIFIC AND TECHNOLOGICAL DEVELOPMENT OF PAKISTAN.**

Four Seminars were organised by PASTIC on the above theme at the following places on the dates specified below during the period under review.

1. National Science Centre, Pakistan Science Foundation P.S.F. Islamabad on 6-7 April, 1981.
2. Institute of Business Administration, Karachi on 18-19 April, 1981.
3. Bahauddin Zakaria University, Multan, on May 6, 1981.

4. Waheed Shaheed Hall, Institute of Educational Research, University of the Punjab, on May 21 & 23, 1981.

In total forty eight (48) papers on different aspects on documentation, informatics and informations technology including computer application in information. The significant recommendations made in these seminars pertained to the strengthening of the interlending library services through the PASTIC Network, creation of a self reliable information system in the country with the active participation of libraries and information units, emphasis on the need of a new International Information Order for the benefit of developing countries and provision of optimum weightage to information services and informatics in the overall national planning.

iv) Document Delivery Service

Three thousand, six hundred and fifteen (3615) new requests were received from different Scientific and Technological Research Organizations, Industries, Universities and other academic institutions as well as individual scientists during the period under review. Out of the above orders, three thousand, one hundred and eighty (3180) were processed and placed with the internal and external information supplying agencies and cooperating libraries. Three thousand, four hundred and eighty seven (3487) documents which also included the literature ordered before consisting of reports, periodical article, patents and other forms of information materials had been delivered to the clients during the period under report. These documents contained thirty nine thousand, four hundred and thirty nine (39,439) pages in total. Regarding printing out-put two lac, eighty two thousand, one hundred and sixty (2,82,160) impression were printed and despatched to the customers. The number of pages duplicated on plain paper copier and Gestofax Machine were one lac, sixteen thousand, eight hundred and eighty five (1,16,885) supplied to the clients during the period under review.

v) Bibliographies

Twenty five selective as well as comprehensive bibliographies on different S & T topics were compiled and provided to the customers. The above bibliographies contained 1,939 citations in all. A few of these bibliographies were computer generated.

v) National Technical Information Service (NTIS) USA

Nine hundred and forty one (941) NTIS Reports pertaining to the U.S. Research & Development were catered to end users during the period under review. Apart from this, one thousand, seven hundred and fifty (1750) copies

of NTIS AMTID catalogues numbering 80-2, 80-3, 80-4, 80-5, and 80-7 were disseminated to the R&D organisations in the country to keep the information consumers abreast with the U.S R&D information potential.

**vii) PATENT INFORMATION**

Ninety one (91) orders were received during the period under review for supply of patent information. These orders were complied with and patent indexes on the required technological information were provided to the customers. Apart from this, sixty four (64) reprints of the Canadian patents were supplied to requesters. Three thousand, six hundred and fifty six (3656) patents on Microfiche were sorted out, arranged and classified.

**viii) ABSTRACTING AND INDEXING SERVICES**

Four bimonthly issues of *Pakistan Current Contents* covering the period from June 1979 to Feb. 1981 were published and distributed during the period under review. Yearly volume of *Pakistan Science Abstracts* containing 200 indicative and informative abstracts accompanied with exhaustive subject and author indexes was published and supplied to R&D institutions in the country. In addition, 347 papers were abstracted during the period under report.

**ix) ENVIRONMENTAL INFORMATION SERVICE**

Eighty eight UNEP/INFOTERRA packages were distributed to different R&D Organizations in order to introduce to them the spectrum of environmental information services that are offered by PASTIC National Focal Point (NFP).

**x) CURRENT AWARENESS SERVICE**

Nearly 200 content lists of current literature in Science and Technology and copies of papers bearing information of topical interest have been provided to the relevant users in anticipation of their information needs. These despatches pertained to such topics as new renewable energy; alternative technologies project funding; Scientific and development planning; plant and animal research and development; sugarcane cultivation; orange juice extracting; oil and gas; cancer; lazer technology; radar; nuclear safety regulations; geotrends; leprosy; world trade information network; computers and microprocesses; rural development food and nutrition etc. This service helped alert the R&D personnel of the country about the current information potential.

**xi) LIBRARY**

Back volumes of *Biological Abstracts* covering thirty years from 1950-1980 were received. Valuable scientific & technical reference works had also been received under the Netherlands Literature Programme during the period under review.

**xii) PARTICIPATION IN CONFERENCES**

1. PASTIC was represented by the Project Director in the UNEP/INFOTERRA Conference held on the management of environmental information in China from 13-15 August, 1980.

2. PASTIC was represented in the International Congress on Medical Librarianship held at Belgrade from 3-5 September, 1980 by the participation of the Project Director.

**xiii) PASTIC VISITED**

1. Dr. J.D. Faskett, Director, Central Library University of London had paid a visit to PASTIC in July 1980 and discussed issue of mutual interest relating to library and information networking.

2. Computer specialist from UNESCO Mr. Ashok Prakash had visited PASTIC National Centre on 7th September, 1980 and exchanged views on the status and needs of computer application in scientific information in Pakistan.

**II. 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 carries out its statutory responsibility for the support of research through a number of programmes, which include:—

- a) Grant of research projects submitted by individuals or groups of scientists in the universities and research institutions across the nation.
- b) Organization of Integrated Research Programmes.
- c) Institutional Support — provision of equipment, literature, staff training facilities, etc., to build institutional capability for conducting research.
- d) Support for participation in regional and international research pro-

grammes.

**A) Grants of research projects submitted by individual research workers or groups of scientific workers:**

Research Support is the Foundation's principal Programme for promotion of basic and fundamental research, having relevance to the socio-economic needs of the country.

During the period under report, 60 projects costing Rs. 100 million were received by the Foundation. And 57 projects proposals which had been at the various stages of their processing, were carried over from the previous year. Thus, in all, 117 proposals remained under active consideration of the Foundation during 1980-81. These proposals were examined by experts in the relevant fields in the light of their scientific merit and relevance to national needs according to the criteria laid down by the Foundation. The criteria for research are (a) competence of the scientific personnel available 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 (d) likelihood of completion of the project within the stipulated time. Each proposal, after the initial review report, is placed before the Technical and other Committees of the Foundation. During the year, only 20 projects could, however be sanctioned at an estimated cost of Rs. 20 million.

Discipline-wise distribution of grants made by the Foundation during the past eight years, is shown in table-I.

**RESEARCH PROJECTS:**

Summaries of the research proposals sanctioned, during the year, 1980-81 are given below:

**1. AGRICULTURAL SCIENCES: P-AU/AGR (55/1)**

**Title: Pathology of trees.**

The proposal is an extension of the project conducted under the same title.

The proposal aims at preparing the manuscript of the 3rd part 'Disease of conifers' of volume II of the book entitled "Pathology of trees".

The book shall fill a gap in the literature. The plant pathological aspects needed for the students of forestry and horticulture is being covered in detail. This publication will be of great help to the Researchers, Agriculturists, foresters and horticulturists.

2. *BIOLOGICAL SCIENCES*

S-KU/BIO (14/1)

**Title:** *Investigation on Wood anatomy of conifers and polysaccharide components of Eucalyptus, Poplars and conifers of Pakistan.*

The present proposal is an extension of the project conducted under the same title. In a developing country like Pakistan, wood is in great demand by the wood based Industries. For pulp and paper fast growing species are eminently suitable. Paper is imported to the tune of crores of rupees every year. It is therefore highly imperative that local sources for pulp and paper industry is properly and timely developed to meet the ever increasing demands of the industry as well as the need of the local population. The project aims to complete the remaining work on coniferous species and chemical analysis of wood of eucalyptus and popular species found in Pakistan.

The result of this study would be of great value in identifying improved marketable varieties as well as in making improvements in the afforestation plans by selecting fast growing species.

3. *CHEMICAL SCIENCES*

P-PU/CHEM (27/1)

**Title:** *Characterization and Production of Enzymes of Commercial Importance:*

The present proposal is an extension of the project conducted under the same title. A great deal of work has been covered on various aspects of production of enzymes and conditions have been established under which the enzymes production can be increased manifold. These finds have been published in International and local journals of repute.

In the extension project it has been proposed to undertake purification and characterization of enzymes — lipases and proteases.

C-QU/CHEM (73/1)

**Title:** *Kinetics, Electrochemical and Optical Investigation of Bipyridilium Herbicides and related compounds.*

In the past the first reduction products, the methyl viologen action radicals had been proposed to be the sole cause of herebicial activity of paraquat. Recent work has cast the doubt on this hypothesis. The existance of the higher reduction products of the paraquat and 1-ethyl-4-carbomethoxy pyridilium salt have been established. Although significant, the above information is still incomplete.

The present project aims to carry out extensive studies on series of Pyeidimum and pyridinum Salts. Such studies include (a) Chemical properties of the various



**TABLE-I**  
**SCIENTIFIC RESEARCH PROJECTS SANCTIONED DISCIPLINE**  
**WISE DURING JULY, 1973 to JUNE, 1981**

DISCIPLINE	1973-78		1978-79		1979-80		1980-81	
	No. of schemes	Amount sanctioned	No. of schemes	Amount sanctioned	No. of schemes	Amount sanctioned	No. of schemes	Amount Sanctioned
Agricultural Sciences	20	3.842	—	—	2	0.253	1	0.024
Biological Sciences	36	4.844	5	0.453	8	0.747	1	0.147
Chemical Sciences	41	5.399	6	0.980	10	0.727	7	0.631
Earth Sciences	10	1.109	1	0.049	1	0.054	—	—
Engineering Sciences	4	0.389	—	—	—	—	1	0.071
Environmental Sciences	9	1.065	1	0.115	3	0.274	—	—
Mathematical Sciences	3	0.214	—	—	—	—	1	0.020
Medical Sciences	17	1.037	1	0.049	2	0.101	9	1.096
Oceanography	2	0.182	—	—	1	0.283	—	—
Physical Sciences	11	2.427	4	0.492	2	0.136	—	—
<b>Total:—</b>	<b>153</b>	<b>20.508</b>	<b>18</b>	<b>2.038</b>	<b>29</b>	<b>2.575</b>	<b>20</b>	<b>1.989</b>

salts at various temperatures; (b) nature of the higher reduction products as to their paramagnetic and optical properties; (c) thermodynamics of the disproportionation constant; (d) molecular basis of disproportionation constant as studied by molecular orbital theory; (e) complexation of the radical with metals and (f) identification of the reaction products of the pyridinyl radical with proton donors etc.

S-KU/CHEM (84/1)

**Title:** *Isolation and structural studies on the chemical constituents of some indigenous flowering plants:*

The present proposal is an extension of the project conducted under the same title. Preliminary work on these medicinal plants have yielded encouraging results. It is now proposed to carry out thorough Investigations of the chemical constituents of plants namely Propois juliflora, Prosopis glandulosa and Nepeta hindostana. The pure compounds isolated as a result of this work will be subjected to structural, pharmacological, anti-bacterial and anti-tumor studies.

It is also proposed to extract the plant material, left over after extraction with pet.ether and alcohol is expected to yield other interesting compounds.

P-PU/CHEM (104)

**Title:** *Synthesis of Model  $\alpha$ -methylene Lactones and their application to the Synthesis of Biologically active naturally occurring  $\alpha$ -Methylene Lactone Sesquiterpenes.*

$\alpha$ -Methylene Lactones occur frequently in many natural sesquiterpenes of biological interest which have been isolated during the search for antitumor agents from plant sources. The procedure for their isolation are time consuming and costly.

The project aims to synthesize these compounds from available raw material using suitable synthetic reactions. In the first instant model compound would be synthesized and then the synthetic method would be used to prepare biologically active sesquiterpenes.

C-QU/CHEM (114)

**Title: *Phosphorous Intermediates in the Synthesis of Pesticides***

The successive use of Pesticides for pest control measurements in agriculture could be hazardous to human health, if taken alongwith food; they may also be a cause of Environmental pollution.

The present proposal is an effort to synthesize pesticides which may have high chemical and physiological activities, but less hazardous to man and mammals. A number of organo-phosphorus intermediates have been synthesized. Studies relating to the structure characterization, reaction-mechanism leading to the formation of final products, and possible toxic effects are in progress.

The effectiveness of the pesticides in controlling organisms which cause damages to various crops (eg-fungi, weeds etc.) are also being investigated. It is observed that the residue left on the plants etc. at the time of harvesting the crops is less hazardous to consumers.

S-SU/CHEM (116)

**Title: *Application of Volatile metal complexes of some new schiff bases:***

Ketoamine a volatile metal complex can form uranyl and Oxovanadium complexes.

The project aims to prepare, (a) a few new organic reagents with expected better complexing properties; (b) metal complexes of Ni (II), Cu (II), Pd (II) and Pt (II) and to determine them quantitatively; (C) and characterise the uranyl and Oxovanadium complexes.

C-QU/CHEM (122)

**Title: *Silicones from locally available Sillicate minerals.***

Silicone has wide industrial application e.g. it is used as an alloy constituent to strengthen Al, Mg, Fe, etc. It confers corrosion resistant properties to those metals. High purity silica is used in semi-conduction devices such as rectifiers, transistors and solar batteries.

The project aims to utilize silicate minerals, e.g. Biotite, Phlogopite, Muscovite available in Pakistan for conversion into useful polyorgano silioxanes for further conversion into various useful materials such as stable polymers etc. These minerals will also be converted into pure silicone for making waffers in solar energy conversion and into useful electronic components and in alloys etc.

The research work will help to utilize our mineral resources to develop various industries like textile, leather, polymer, agriculture, ceramic, glass and medicine and Silicone industry.

4. **ENGINEERING SCIENCES:** P-PU/ENGG (15)

**Title:** *Design & Development of an Electric Passanger Transport.*

Transport has become one of the basic necessities of life whether or not owned personally. Particularly important aspect of it is the passenger transport within urban limits. The means of this kind of transport are lacking in our society. The need for such transport increases many fold with the development of industrial estate, expansion of cities and increase in population.

The project aims to investigate all processes of development right from design to putting an electric car on the road. Locally available technology will be used except some motor control equipment.

5. **MATHEMATICAL SCIENCES:** P-PU/MATHS (13)

**Title:** a) *Existance and properties of generalised free products of certain group amalgams.*

b) *Determination of necessary and sufficient conditions for freeness of  $(a,b)$ ,  $a,b$ ,  $ESL(n,f)$  and some problems in representation theory of groups.*

The project aims at investigating two of the fundamental and basic problems in group theory.

- i) To solve problems concerning amalgams of groups with the  $F^*$  property. Moreover to solve the problem that whether or not amalgam is embeddable in a finite group.
- ii) To examine some of the open problems concerning the freeness of  $(a,b)$  when the nature of  $a$  and  $b$  is known. Some group representation problems shall also be investigated.

6. **MEDICAL SCIENCES:** C-AFMC/MED (46)

**Title:** *Cutaneous Leishmaniasis in Baluchistan Area:*

Leishmaniasis is endemic in Pakistan not only in Baluchistan but also in a belt going from D.G. Khan upwards to NWFP. Initially it is proposed to start epidemiological studies from the area known to be highly endemic.

The project aims at collecting epidemiological information in order to collect data for undertaking measures to control the disease and to create a research base so as to extend the investigation to the country wide level.

P-SGR/MED (48)

**Title: *Cholelithiasis and Incidence of Carcinoma in Gall Bladder disease:***

The project aims to obtain the pattern of gall bladder disease and cholelithiasis and its correlation with carcinoma of gall bladder.

Multi centre studies shall also be conducted which will include clinical, histological and biochemical analysis.

P-PMI/MED (49)

**Title: *High Altitude Medical Research project, Changes in Renal Function:***

The kidney plays a key role in the maintenance of fluid, acid-base and electrolyte balance in the body. Large number of influences in the form of hormones, sensitive receptors and unknown factors effect the kidney and maintain the normal body environment.

Man at high altitude is exposed to an abnormal atmospheric pressure and thus low uptake of oxygen effect the body tissue leading to a stressful situation.

The project proposes to study the renal response to high altitude in human being. These changes in renal function will give a better understanding of acute sickness, high altitude pulmonary and cerebral oedema.

F-AMC/MED (50)

**Title: *Prevalence and Prevention of Tuberculosis in Children:***

Tuberculosis is a major health problem of our country. It used to be the major cause of mortality and even now is one of the main cause of mortality and ill-health especially amongst the low socio-economic classes of our country.

It is well established that younger the age, the greater is the likelihood of activity and dissemination.

The project aims to (i) prevent tuberculosis in children and (ii) actively treat those cases with the results with cheap combination of drugs effective within minimum period of time suitable to our resources and socio-economic circumstances and phase type of tuberculosis bacillus prevalent in our country.

If active steps are taken to protect our children against this disease it will not only reduce its incidence but to a great extent diminish the risk of all forms of tuberculosis even in our adult population when so many effective and also cheap chemotherapeutic agents are available alongwith the effective means of prevention.

P-PMI/MED (53)

**Title:** *Role fo Calcium in Renal stone Formation in Pakistan:*

Urolithiasis is a major epidemiological problem in Pakistan, especially in the centre of the country. Calcium plays a key role in stone formation. Florid primary hyper para-thyroidism is a well known cause of stone disease in minority group.

The project aims to study the role of calcium in the stone patients at Lahore and Karachi. This will help in reducing stone recurrence.

C-QU/MED (55)

**Title:** *Hormonal levels and Secretary patterns in rhesus monkeys with induced polycystic ovaries.*

The objective of the present study is to compare the hormonal profile in blood, ovarian tissue and follicular fluid in intact monkeys and animals with induced cystic ovaries. It is also planned to assess the gonadotropin response of the normal and cystic ovaries in this species.

The investigation is of direct relevance to problems of infertility in the human. It is hoped that the information gained will be of use in understanding the hormonal imbalance associated, with polycystic ovarian syndrome and may lead to improved clinical management of the disease.

P-MHL/MED (57)

**Title:** *Epidemiological study of the Orbital Tumours in patients attending the Mayo Hospital, Lahore.*

The orbital tumours though occur in all age groups, but are more prevelent and severe in children and younger age groups. Many cases are seen in advanced stage because of lack of early diagnostic facilities in peripheral hospitals.

The project aims to study the Orbital tumours in those cases which are referred to Mayo Hospital, Lahore, i.e. on self selection basis. The ultimate objectives would be to link the early diagnosis and life of the patient. The project would try to establish lien with other Eye Units in the country for collection of data about the

**Orbital tumours.****S-DMC/MED (67)**

**Title: *To study the prevalence, clinical presentation and Management of Juvenile-Rheumatoid Arthritis — J.R.A.***

Rheumatoid arthritis is a crippling disease particularly when it develops in young age and leads to both social and economical loss to the community.

The project aims to study the prevalence, clinical presentation and management of Juvenile-Rheumatoid Arthritis (J.R.A). This will be helpful to the community and will stimulate other research workers for similar studies elsewhere in the country and information made available will help for timely intervention.

**C-NIH/MED (69)**

**Title: *Study of Viral Respiratory Diseases in Children in Rawalpindi/Islamabad area:***

The continuous massive morbidity from acute respiratory infections with the attendant economic losses in the countries and the high premature mortality from viral and bacterial pneumonia in many developing countries poses a real threat.

Virus have been blamed for acute respiratory disease.

The project aims to (i) identify the viral agents attributable to acute respiratory disease in defined population; (ii) age group of children which are at special risk; (iii) Environmental conditions (including physical and social conditions) to influence the incidence and severity of the respiratory disease; (vi) serodiagnosis and seroepidemiological investigations.

As a result of these studies control measures shall then be tailored at local needs and national health service resources, while special control measures including vaccines shall be prescribed for the population under study. The data can also be useful in expansion of study to other population.

**B. INSTITUTIONAL SUPPORT:**

Grants amounting to Rs. 16,640 64/- were sanctioned to various Institutions during the current year to enhance their Institutional capabilities (Annexure—II)

**III. UTILIZATION OF RESEARCH RESULTS.**

**Title: *The utilization of the scientific and technological research, including pilot plant studies, to provide the technical and economic feasibility of processes found to be promising on laboratory scale.***

Special attention has been paid by the Foundation to develop projects for the

utilization of results of research. The projects sanctioned by the Foundation are progressing satisfactorily. Some of them are in their final stages of completion.

#### **IV. SCIENCE CENTRES**

*The establishment of Science Centres, Clubs, Museum, Herbaria and Planetaria.*

The establishment of Science Centres, Clubs, Museum etc. is essential for creating science awareness among masses in the country. The Foundation is endeavouring to establish such institutions to popularize science among people.

Progress made by the Foundation in this regard is as under:

##### *a) Establishment of Pakistan Museum of Natural History*

The implementation of the project was undertaken according to the approved plan and the following achievements have so far been made during the report period.

- i) Four Senior posts (i.e, those of Director General and three Directors, one each for Zoological, Botanical and Earth Sciences Division) were advertised to select appropriate persons for these specialized jobs. Selections have been made for the post of Director General, Director Zoological Sciences and Director Earth Sciences. The Ministry of Science and Technology accorded approval to the appointment of Director, Earth Sciences Division and his case is being processed in the Establishment Division.
- ii) A suitable building has been hired for housing the Natural History Museum as per provision in the approved project.
- iii) Services of two trained officers were requisitioned on deputation from the Geological Survey of Pakistan. One of the two officers has since joined the post of Associate Curator and work has accordingly been initiated in Earth Science Section.
- iv) Setting up of the exhibition hall of the Earth Sciences Section is in progress. Most of the fossil fauna, acquired from Geological Survey of Pakistan, Quetta, has been identified. A thirteen million years old crocodile skull with complete jaw from potwar plateau has been added to the collection.

##### *b) National Science Centre:*

During the report period the National Science Centre arranged a number of discussions, seminars, symposia, film shows etc. for creating public awareness and generating general interest in Scientific and Technical Advancements within and out-



side the country. Some of the talks/meetings arranged are mentioned below:

1. Meeting of Alkindi Society.
2. جشنِ اسلام، سیرۃ النبیؐ، اسلام اور سائنس
3. Scientists forum.
4. "Some mysteries and marvels of snake toxicology of snake venom" by Mr. S.M. Asim.
5. "Wild life Preservation" by Mr. Z. B. Mirza.
6. اقبال کے نظام فکر میں سائنس کا مقام
7. "Energy Situation in the developing world" by Dr. I. H. Usmani.
8. جشنِ نزولِ قرآن، قرآن اور سائنس
9. "Microbiological Technology" by Dr. Khurshid Ahmad.
10. Film on Islam & Science" screened for students.

c) *Science Fairs/Exhibitions*

i) The Foundation provided a grant of Rs. 50,000/- to the Board of Intermediate and Secondary Education, Lahore in year 1980-81, for organizing a two weeks Science Fair at the Museum of Science & Technology, Lahore from 2nd to 15th February, 1981.

The objectives of the Science Fair were as under:

- To develop the creative abilities of studies by encouraging and helping them to translate scientific ideas into workable models.
- To illustrate scientific concepts through experiments and demonstrations and to help understand basic concepts of science.
- To revive interest in science education among the students, teachers and general public and to motivate the students to adopt scientific professions.
- To promote scientific literacy.

As many as 42 high schools/colleges and some R&D organizations of Lahore and adjoining areas participated in the fair and displayed as many as exhibits prepared by the students.

The subject wise ratio of these exhibits is as under:

— Electrical and electronic exhibits	= 60%
— Biological exhibits.	= 22%
— Chemical processes or products.	= 12%
— Miscellaneous	= 6%

The above ratio clearly indicates the interest of students in the field of electronics. If due attention is given to exploit this talent, there would not be shortage of manpower.

The Fair was visited by more than 80,000 people. Daily newspapers published special pages on this occasion and highlighted the need for such exhibitions in the country. Popular lectures by eminent teachers and scientists on Scientific & Technological topics were arranged and S&T documentary film shows daily during the Science Fair. In view of the success of this Science Fair the British Council made an offer that they will award one month's study visit to U.K. to two children i.e. one boy and one girl who will present best exhibit in the next Science Exhibition. The President of Pakistan in his message said "that the Fair was good attempt to take the science out of the narrow domain of special teaching institutions to the common people, he stressed that such Fair should be organized in all parts of the country.

#### V. *SCIENTIFIC SOCIETIES/LEARNED BODIES.*

Annual grants amounting to Rs. 2,95,000/- were sanctioned this year to various Scientific Societies and Learned Bodies for the achievement of their approved objectives (Annexure—IV).

Special grants totalling Rs. 1,10,000/- have been sanctioned to various Scientific Societies for their publication programme (Annexure—V).

#### VI. *SCIENCE CONFERENCES.*

*The Organization of periodical Science Conferences, Symposia, Seminars etc.*

Conferences, Seminars & Symposia serve as important means for the exchange of ideas and information amongst the scientific workers. The Pakistan Science Foundation during the report period has provided grants totalling Rs. 1, 40,000/- to various Scientific Societies/Institutions in the country for holding Seminars, Symposia, Conferences (Annexure—VI). A brief account of these Conferences/Seminars is given below:

- 20th Annual Science Conference was held under the auspices of Scientific Society of Pakistan from 21st to 25th August, 1981 in Federal Govt.

Urdu Science College, Karachi. About 800 participants attended the above Conference and papers were presented by distinguished scientists.

- A National Energy Conference was organized by Energy Society of Pakistan, in Lahore on 16th March, 1981. A large number of papers were presented and there was wide ranging discussions on various aspects of energy problems.
- A National Statistical Conference was arranged by Allama Iqbal Open University in Islamabad from 18-21 April, 1981. More than four hundred statisticians and other Scientists including Pakistani Statisticians from abroad attended the Conference and presented papers.
- An International Symposium on Islam & Science was arranged by the Ministry of Science and Technology from 1st-12th November, 1981 in Islamabad. A number of Foreign Scientists/Scholars participated in the Symposia.
- A Seminar on "Physics of Mixed Solids" was organised by Quaid-i-Azam University, Islamabad from 14th to 19th February, 1981 in Islamabad. The Seminar was attended by large audience and papers were presented by distinguished Scientists on the recent developments in the physics of mixed solids.
- A National Seminar on "Application of Remote-Sensing" Techniques in Water Resources Development and Management was organised by Centre of Excellence in Water Resources Engineering, University of Engineering and Technology, Lahore in collaboration with Pakistan Science Foundation, University Grants Commission and Pakistan Space & Upper Atmosphere Research Committee. This Seminar was first of its kind. Main emphasis were made on the application of the most modern and sophisticated technology of remote sensing to various practical problems of floods, water logging and salinity and ground water exploration.
- A one day Seminar on "Village Level Sugarcane Processing" was organized by the Appropriate Technology Development Organization, Ministry of Science & Technology on 11th April, 1981 in Islamabad. Technical papers were presented at this Seminar and several recommendations were adopted at the end of the deliberation.
- A Seminar on "Role of Scientists and Engineers" in the Improvement of Productivity was held on 9th May, 1981 under the auspices of Institution of Engineers, Pakistan at Hotel Flashman, Rawalpindi. About 100 eminent Engineers/Scientists and members of the Rawalpindi Centre

attended this interesting seminar. Three technical papers were read out by three Engineers.

Two National Seminars, on 'Bio-gas technology' and 'Dehydration and Preservation of Fruits and Vegetables' were organised by Appropriate Technology Development organization in collaboration with Energy Society of Pakistan and Ayub Agricultural Research Institute, in Lahore and Faisalabad respectively. A large number of Papers were presented and there was wide ranging discussion on relevant aspects.

#### **VII EXCHANGE OF VISITS.**

*Exchange of visits of Scientists and Technologists with other countries.*

Grants totalling Rs. 1,73,851/- were given to nine Scientists (Annexure—VII) to enable them to attend International Conferences, Symposia and Seminars.

#### **VIII AWARDS & FELLOWSHIPS.**

*Grant of awards, prizes and fellowships to individuals engaged in developing processes, products and inventions of consequence to the economy of the country.*

The Foundation did not receive any proposal of Scientific merit for the award of prizes, medals etc. However, four fellowships were sanctioned to the Nuclear Institute for Agriculture & Biology for the 8th Annual Post Graduate Course on Nuclear and other advanced techniques in Agricultural and Biological Research.

#### **IX SURVEYS & STATISTICS.**

The project entitled: "Review of research work done and current research in the field of Agriculture, has been completed and the directories so far prepared are being printed.

#### **X RESEARCH EVALUATION.**

The Foundation evaluated the following technical/fiscal reports, received during the report period, as per procedure laid down for reviewing the progress of scientific research supported by the Foundation and evaluating the results of such research.

##### **i) Semi-Annual Reports:**

Twenty-four semi annual reports, invited after the initiation of each project and after the submission of the annual reports, were scrutinized by the Science Wing to assess the interim progress of these projects.

ii) *First and Second Annual Reports:*

Thirteen First annual and eight Second annual reports submitted by the Principal Investigator, after initial scrutiny by the PSF Science Staff, were sent for detailed evaluation to active scientists in the relevant field of specializations.

These progress reports were then submitted to the relevant Technical Committees for consideration alongwith the evaluation report of the experts concerned. The reports were ultimately accepted by the subject committees.

iii) *Final Reports:*

Thirteen final reports in respect of the completed research projects, received during the year under report, were also sent to the subject experts for evaluation. On receipt of the evaluation reports, these were considered and accepted by the relevant committees.

*XI PSF SCIENTISTS POOL:*

Three scientists, who had returned from abroad after completing higher education and were looking for jobs suited to their qualifications, were placed on the scientists pool and assigned to various Universities.

In addition, biodata of 19 Pakistani Scientists living abroad and interested in returning to Pakistan were circulated amongst various Universities and Research Institutions in order to assist them in finding appropriate employment in Pakistan.

*XII INTERNATIONAL LIAISON:*

The Foundation, during the report period, remained in contact with international, regional and national agencies like United Nations Educational, Scientific and Cultural Organization (UNESCO), Man & Biosphere, United Nations Environment Programme (UNEP), Economic & Social Commission for Asia and the Pacific (ESCAP), National Technical Information Centre (NTIS) and US-National Science Foundation and their representatives visited Pakistan Science Foundation to discuss mutual collaboration in the field of Research, Conferences and Seminars.

The proposal for establishing cooperation with the Royal Society London under a Memorandum of Understanding is presently under Government consideration. The memorandum if signed would promote close liaison among the scientists of the two countries.

## CHAPTER - 2

**PROGRESS OF THE PSF SUPPORTED PROJECTS**

An account of the progress reports of PSF supported projects received during the year 1980-81 is given below.

**A) FINAL REPORTS**

During the year under review thirteen final reports were received. Particulars of these schemes and brief summaries of the achievements made in these projects are as under.

<b>Project No.</b>	<b>P-AU/AGR (31)</b>
<b>Project Title</b>	<b>Cytogenetic studies of Branched Ear Derivatives in Wheat.</b>
<b>Name of Investigator</b>	<b>Dr. M. Aslam</b>
<b>Project Particulars</b>	
<b>Duration</b>	<b>Three years</b>
<b>Date of commencement</b>	<b>1.6.1976</b>
<b>Date of completion</b>	<b>31.5.1979</b>
<b>Implementing Agency</b>	<b>University of Agriculture, Faisalabad.</b>
<b>Total expenditure</b>	<b>Rs.76,940/-</b>
<b>Main objectives:</b>	<b>To improve the grain quality and seed size by thoroughly screening the material at hand and hybridization after careful cytological studies of the promising strains.</b>

**Summary of the Work Done:**

The primary objective of the studies was to find out the possibility of developing stable homozygous lines of *T. aestivum* with branched spikes transferred from *T. turgidum*.

The observations of the last three years have clearly shown that fully branched lines keep segregating but the lines with basal branching or half

branched spikes do attain homozygosity in branching of spike, height of plant and grain characteristics. Some lines were selected which showed promise of developing about 100 bold grains or more per spike. The chromosome studies in these plants showed no abnormality. It was also observed that branching habit was controlled by many genes and was also influenced greatly by environments.

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<b>Project No.</b>	<b>P-PU/BIO (6)</b>
<b>Project Title</b>	<b>Palynological studies of the plants growing in Punjab. (b) Seasonal variations in the frequencies of air Borne pollen and spores which cause Allergies and Asthma with special reference to Central Punjab.</b>
<b>Name of Investigator</b>	<b>Dr. M. S. Zahoor</b>
<b>Project Particulars:</b>	
<b>Duration</b>	<b>Three years</b>
<b>Date of commencement</b>	<b>1.7.1975</b>
<b>Date of completion</b>	<b>30.6.1978</b>
<b>Implementing Agency</b>	<b>Punjab University, Lahore</b>
<b>Total expenditures</b>	<b>Rs.1,20,000/-</b>
<b>Main objectives:</b>	<b>Certain type of spores and pollen grain remain suspended in air during dry season and are known to cause Asthma and allergies. Palynological studies deal with the morphological details of spores and pollen grain.</b>

***Summary of the Work Done:***

The work on the survey of pollen types of 486 belonging to 81 Angiospermic Families are distributed over a quite variable pollen types. It is, therefore, now possible in Punjab to identify good number of pollen species on the basis of present investigations. The pollen grains which have been studied so far have been compared with other pollen floras of the world and their re-

relationships or differences have been provided in the text alongwith the pollen descriptions. In certain cases no information was available because in Pakistan this field remained neglected. Due to this reason it remained a difficulty to apply polynology in other disciplines specially the medicines. The basic knowledge in polynology in Punjab was especially not available. Now to some extent the present studies have yielded good results on the following grounds.

1. Pollen Bank of more than 650 plants of Punjab has been established in the Department of Botany, University of the Punjab, New Campus, Lahore.
2. Slides of over 500 (10 slides each) plants are readily available for comparison and identification purposes.
3. Pollen catalogue of 486 species has been compiled.

The Science of Polynology has been introduced in Pakistan for the first time as far as its application towards Airborne flora is concerned because pollen flora which is airborne cause Asthma, Allergies and Pollenosis.

In this respect two devices 'AERO-POLYNO-TRAP' and uniform glycerine jelly slide coater are being successfully used. These devices were produced from own resources. In addition to that effects of temperature, humidity and wind etc. on the uprising of pollen grains is also under investigation. Pilot experiments on this newly prepared apparatus have shown good results.

The airborne data collected in Lahore showed that in the air, pollen is most abundant in the periods of March-May and September-November. The investigation also showed that among the variety of grains the pollen of grasses is most abundant over a longer period. It may also be assumed that these grains may also cause pollenosis to certain individuals ( in other countries the records of such individuals are available but in Pakistan pollen tests on individual are not made because it has to be carried out in medical colleges). Under certain circumstances it has been noticed that pollen grains of grasses may rise quite high above the ground during day time and they start downward journeys at late hours in the morning causing hayfever. The pollen other than grasses may show that they too cause seasonal allergies.

The investigation on honey have proved that honey collected from actual bee-hives has higher contents on pollen grains as compared to Farm honey (commercial honey). As grains carry many essential constituents therefore, the natural honey is more beneficial in contrast to farm or commercial honeys.

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**Project No. :** P-AU/BIO (38)

**Project Title :** Collection and study of fish fauna of Punjab.

**Name of Investigator :** Dr. Nadeem Sheri

**Project Particulars**

**Duration :** Three years

**Date of commencement :** 25.7.1976

**Date of completion :** 24.7.1979

**Implementing Agency :** Agriculture University, Faisalabad.

**Total expenditure :** Rs.1,08,072/-

**Main objectives:** The work under this scheme envisages collection, preservation study and classification of all the fresh water fishes of Punjab and to establish a national fresh water fishes reference museum both for the students and research workers.

**Summary of the Work Done:**

Under this project fishes from Punjab were collected and identified and morphometric data was recorded in respect of each of the fish species collected from various waters in Punjab Province. The taxonomic characters were subjected to numerical treatment with a view to assessing the soundness of the existing classification system at the specific level. The morphometric measurement in respect of 27 parameters of the fish body have been induced under each species and these being quite stable and permanent for a species are being proposed for the 1st time as useful taxonomic characters. Tables of comparison of characters have been prepared to compute percentage similarity among various species of each genus and therefrom phenograms have been constructed to show the level of morphological relationship among them. The present work has shown the status of various species established by previous taxonomists. However, the desirability of splitting the genus into two sub genera has been indicated.

*Publication as a result of these investigations:*

1. Sheri, A.N. and M. Chaudhary, 1976  
Growth studies of *Cirrhina mrigala* (Ham) Pak. J. Agric. Sci. XIII (3-4)  
83 - 89.
2. Sheri, A. N. & T. Saied, 1976.  
Morphometric studies of some important fishes of District Jhang, Part  
I (Family Cyprinidae), Bull. Hydrobiol. Res., 1 (13): 205 - 218.
3. Sheri, A. N. & T. Saied, 1977.  
Morphometric studies of some important fishes of District Jhang, Part II  
(Families Siluridae and Schilbeidae). Bull. Hydrobiol. Res. 1 (16): 321-  
337.
4. Sheri, A.N. & T. Saied 1977.  
Morphometric studies of some important fishes of District Jhang, Part II  
(Families Clupeidae, Bagridae and Channidae). Bull. Hydrobiol. Res. I  
(17): 363 - 372.
5. Sheri, A.N. & A.H. Jafri, 1977.  
Morphometric studies of common fishes of Punjab (*Labeo calbasu*,  
Family Cyprinidae) Bull. Hydrobiol. Res. 1(17):373-385.
6. Sheri. A.N. & A.H. Jafri, 1978.  
Morphometric studies of fishes of Punjab (*Cirrhina reba* Family Cy-  
prinidae) Bull. Hydrobiol. Res. 1 (20-21): 445-456.
7. Sheri, A.N. & T.Saied, 1978  
Morphometric studies of common fishes of Punjab (*Barbus sarana*,  
Family Cyprinidae) Bull. Hydrobiol. Res. 1 (20-21): 466.
8. Sheri, A.N. & Najma Perveen, 1979.  
Morphometric and growth studies of *Labeo rohita*. Pak. J.Agric.Sce  
(Accepted).
9. Naqvi, R.S., J.I. Qureshi and A.N. Sheri, 1979.  
Age and growth studies of *Catla catla*. Pak. Agri. Sce.(Accepted).
10. Akhtar, N.J,I. Qureshi and A.N. Sheri, 1979.  
A comparative study of various attributes of fish scales with age and  
establishing affinities among some common fish species of the Punjab.  
Pak. J. Agri.Sc. (Accepted).

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**Project No.** : C-IU/BIO (62)

**Project Title** : Studies on the mechanism of Synthesis, release and regulations of human chronic Gonadotrophin in Syncytiotrophoblast cells of Placenta, characterization of mRNA, Polyribosomal Complex and other factors involved.

**Name of Investigator** : Dr. Mohammad Saleem

**Project Particulars**

**Duration** : Two years

**Date of commencement** : 1.5.1975

**Date of completion** : 30.4.1977

**Implementing Agency** : Quaid-i-Azam University, Islamabad.

**Total Expenditure** : Rs.2,16,689/-

**Main objectives:** The project envisages characterization of messenger mRNA & Poly ribosomal complex from the Placental Syncytiotrophoblast. This would provide basic information on an important aspect of human reproductive physiology.

**Summary of the Work Done:**

In this project the protein synthesizing machinery involved in the synthesis of HCG by the placented tissue was studied. For this study the following experiment were designed and conducted:

1. Isolation of syncytiotrophoblast by cell dispersion technique using enzymatic methods (collagenase, viocase).
2. Isolation of polyribosomal complex from cells synthesizing HCG.
3. Extraction of tRNA from ribosomes free cytoplasm.
4. Extraction and purification of mRNA.

5. **In vitro studies of the incorporation of labelled amino acids in newly synthesized protein by placental tissue and cell free system.**
6. **Identification of HCG in the newly synthesized protein by column chromatography, polyacrylamide gel electrophoresis and radioimmunoassay.**
7. **In vitro translation of HCG mRNA.**
8. **Effect of estrogen, progesterone, and prostaglandin on HCG synthesis in cell free system.**
9. **Effect of cyclic AMP and adenylcyclase on HCG synthesis.**

It has thus been observed that these accomplishments have supplemented the knowledge of HCG synthesis and the information obtained would be of greater help in understanding the nature of HCG synthesis and its regulation under normal conditions and will also help in studying abnormal tissue, like choriocarcinoma which synthesizes huge quantities of HCG and in cases of HCG deficient placenta.

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<b>Project No.</b>	:	<b>C-QU/BIO (83/1)</b>
<b>Project Title</b>	:	<b>Studies on the Physiological role and regulation of Pancreatic hormones.</b>
<b>Name of Investigator</b>	:	<b>Dr. M. Maqbool Ahmad</b>
<b>Project Particulars</b>	:	
<b>Duration</b>	:	<b>Two years.</b>
<b>Date of commencement</b>	:	<b>August, 1978</b>
<b>Date of completion</b>	:	<b>May, 1980</b>
<b>Implementing Agency</b>	:	<b>Quaid-i-Azam University, Islamabad</b>
<b>Total expenditure</b>	:	<b>Rs.34,425/-</b>
<b>Main objectives:</b>	:	<b>The project envisages to study histochemistry of the amphibian pancreas,</b>

effect of different drugs on the regulation of pancreatic hormones and physiological role of the pancreas on various metabolic parameters such as relationship of pancreas with other major endocrine gland.

*Summary of the work Done:*

In present investigation the role of pancreas in metabolism of carbohydrate on *Rana tigrina* was studied by observing changes produced in the blood glucose level, liver glycogen content and in histology of the pancreatic islets after the administration of insulin, glucose, insulin with glucose, Co-salt chloride, adernalin and hydrocortisone. The methodology for anaesthesia and blood sampling was standardized and then the animals were studied in regards to both dose and the time. The time required for an initial response to blood sugar altering stimuli and for the re-establishment of metabolic homeostasis after changes have been produced, is much greater in amphibians than in mammals and birds. This is probably associated in part with the higher temperature at which these processes normally occur in warm blooded animals but may also be due to difference in metabolic mechanisms.

The study showed that insulin plays a major role in carbohydrate metabolism and that glucose directly stimulates insulin release from cells of the pancreas. These findings suggest that like mammals, frog has also a good homeostatic mechanism for the regulation of blood glucose concentration.

In the present investigation, it is also interesting to note that there is a complete absence of blood sugar in some of the individuals of the species *R.tigrina*. This is perhaps the most intriguing problem presented by the amphibians and requires further investigations.

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Project No.	:	S-KU/CHEM (7)
Project Title	:	New Calorimetric technique of measurement of heat of mixing of organic liquids.
Name of Investigator	:	Dr. Akhlaq Ahmad
Project Particulars:		
Duration	:	Three years

Date of commencement	1.3.1977
Date of completion :	28.2.1980
Implementing Agency :	University of Karachi, Karachi
Total expenditure :	Rs.89,765/-

**Main objectives:** The proposed project involves studies on heat and volume effect in Physical and Chemical processes to understand the nature and extent of these reactions. These studies would also help to understand the state of gases, liquid and solids.

***Summary of the Work Done:***

A calorimeter has been designed, constructed and calibrated by using internal standard of liquid mixture such as benzene + carbon tetra-chloride and n-hexane + cyclo hexane at room temperature. By this calorimeter a new method of measuring exothermic and endothermic enthalpies  $E^H$  has been developed. The enthalpy was measured for equimolar mixtures of pairs of the liquids with standard liquid at different temperature to test the theory of complex formation.

The important factor which effect in measurement of E is the vapour spare in contact with liquid being mixed or studied; this factor has been tried to minimise here. The two liquids are confined separately over mercury in that there is complete absence of any vapour space. The heat losses have been taken into account in mixing, stirring and calibrating, the temperature variation has been measured by some electronic techniques.

***Publication as a result of these Investigations:***

Dr. Ahmed, Akhlaq & Iqbal, Syed Mohammad;  
Enthalpy of Mixing of Benzene & carbon tetrachloride; Pakistan Journal of Science, Vol. 31 No. 3-6, 1979.

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Project No.	:	P-CSIR/CHEM (51)
Project Title	:	Use of activated clays for prevention of Infestation in stored Cereal Grains.

Name of Investigator Dr. S.I. Ali.

**Project Particulars:**

Duration	Three years
Date of commencement	1.6.1975
Date of completion	31.5.1978
Implementing Agency	PCSIR Laboratories, Lahore.
Total expenditure	Rs.78,976/-

**Main objectives:** To utilize indigenous materials for the production of activated clays and devise suitable methods for their application to prevent infestation in cereal grains.

**Summary of the Work Done:**

Forty six samples of Clay from different locations in Pakistan were collected and chemically analysed to find out their mineral constituents. The clays containing high percentage of Kaolin and high insecticidal properties, were selected for activation, and a method was standardized for activation of the clays. The optimum level for mixing activated clays with wheat grains, to obtain maximum insecticidal effects, was determined.

Rat feed trials were conducted to assess possible toxic effects of these clays when mixed with wheat and milled into flour for human consumption. It was observed that the rats thrived on the test of the control diet equally well.

Aluminum sulphate (if  $H_2SO_4$  is used for activation) or Aluminum chloride (if HCL is used for activation) are bye-products of the activation process. These chemicals are being consumed by textile, paper and other industries. Production of activated clays will help in reducing dependence on import of these chemicals.

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**Project No.** F-PU/CHEM (60)

**Project Title** Molecular weight and size measurement of Colloidal, polymer and macromolecular materials by light scattering techniques.

**Name of Investigator** Dr. Noor Ahmad

**Project Particulars:**

<b>Duration</b>	Three years
<b>Date of commencement</b>	1.11.1976
<b>Date of completion</b>	30.12.1979
<b>Implementing Agency</b>	Peshawar University, Peshawar
<b>Total expenditure</b>	Rs.1,37,310/-

**Main objectives:** *The project envisage study of molecular weight and size measurement of colloidal, polymer and macromolecular materials by light scattering techniques.*

**Summary of the Work Done:**

Polymer and colloidal systems which have been characterized making use of light scattering techniques are (i) sample of cellulose acetate obtained from Ravi Rayon Chemical complex, Kala Shah Kaku, Lahore, Pakistan and (ii) a silica polymer under the trade name of Ludox-LS manufactured by E.I.DU Pont DE NEMOULRS Co. (INC) WILMINGTON (DELAWARE) U.S.A. This light method has specific advantages for determining parameters like molecular weight and size of the material with in a very broad range. A further advantage being that the moderately concentrated solution can be studied to a great accuracy as compared to the other methods employed for this purpose.

Very little work has been done on molecular weight measurement of the polymers which is extremely vital for the quality control of the final product of the polymer.



The second part of this technical report consist, of the studies made on the presumably spherical particles of Ludox-LS, the size of which has been found to be fairly monodisperse lying in the range of 18.53 nm to 19.1 nm. For these determinations the disymetry and turbidity methods one of greater use as compared to Zimm plot method, which has been used in the final stage of the project to determine the molecular weight of the samples. Both of these studies have been carried out keeping in view the development of newly up-coming polymer industry in Pakistan. In the next phase of the project a more closer co-operation and collaboration with the polymer industry is sought.

**Publication as a result of these Investigations:**

1. Noor Ahmad and Musa Kaleem "Size measurement of Cellulose Acetate' by light scattering techniques; 52nd Colloid surface Symposium, Tennessee USA.
2. Noor Ahmad and Musa Kaleem "Molecular weight of cellulose acetate by light scattering techniques" accepted for publication in J.Sci. and Tech. Vol. 3, No.1.
3. Noor Ahmad and Iqrar Zaidi, "Size measurement of Ludox particles by light scattering techniques" accepted for publication in the Pak. J.of Sce. Res. Vol.32, 1980.
4. Research papers one with Musa Kaleem and second with Mr. Iqrar Zaidi are under preparation to be submitted soon for publication.

<b>Project No.</b>	<b>C-QU/CHEM (101)</b>
<b>Project Title</b>	<b>Synthesis and Testing of 1,2,4-Triazines as Potential Anti-Malarial.</b>
<b>Name of Investigator</b>	<b>Dr. (Mrs) Roshan Ahmad</b>
<b>Project Particulars</b>	
<b>Duration</b>	<b>One Year &amp; three months</b>
<b>Date of commencement</b>	<b>15.9.1979</b>
<b>Date of completion</b>	<b>31.12.1980</b>

**Implementing Agency**                      **Quaid-i-Azam University, Islamabad**

**Total expenditure**                      **Rs.35,546/-**

**Main objectives:**

The project envisages the preparation of a number of compounds to test their antimalarial activity. It is further anticipated that 3,5-bio (methyltino derivative's which are intermediate in the synthesis might show enhanced anti-malarial activity due to the presence of sulphur in the nucleous.

**Summary of the Work Done:**

The structural modification of active antimalarial substances is one of the most important approaches to the synthesis of new drugs. Many pyrimidine bases have shown enhanced antimalarial action. Beside the known antimalarial drugs the search continues for the ideal antimalarial drugs in an in-expensive, platable, long acting antitoxic compounds, that is suppressive and creative.

The 6-aza analog of trimothoprime is reported to be synthesized and the antimalarial activity of this compound is yet to be published.

The methoxy benzyl (24-B) and unsubstituted benzyl were synthesised to study the role of the methoxy group.

Two thio-semicarbazone of 4 amino and 4-dimethylamino groups have also been synthesized. Attempts to cyclize their compounds by normal procedure did not give the desired product. Efforts are being made to cyclize them too. Since compound (13), with 4 chloro phenyl group and its other analogs were found to be pharmacologically active hence they are being synthesized. The effect of amino group in this class of antimalarials is quite important. Four dithiones have been synthesized and are confirmed by different techniques i.e. melting point, infrared, nuclear magnetic resonance and mass spectra. As soon as the required quantity is synthesized further progress will be made by checking antimalarial activity.

**Publication as a result of these Investigations:**

Three research papers are under preparation.

**Graduate Degrees:**

One M.Phil degree and two M.Sc. degrees were awarded.

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<b>Project No.</b>	<b>S-SU/EARTH (5)</b>
<b>Project Title</b>	<b>Exploration &amp; evaluation of the economic mineral potentials and deposits of Nagar Parkar Area, Southern Sind.</b>
<b>Name of Investigator</b>	<b>Dr. Rais Ahmad</b>
<b>Project Particulars</b>	
<b>Duration</b>	<b>Three years</b>
<b>Date of commencement</b>	<b>2.4.1976</b>
<b>Date of completion</b>	<b>30.6.1980</b>
<b>Implementing Agency</b>	<b>University of Sind, Jamshoro.</b>
<b>Total expenditure</b>	<b>Rs.43,785/-</b>

**Main objectives:**

The project aims at exploring the Nagar Parkar Igneous complex area for metallic (copper, molybdenum, strontium, ores of copper, lead zinc, gold) and non metallic deposits of economic importance. A geological map of the Nagar Parkar will be prepared, the rocks will be identified and classified. The huge deposits of fresh granites of china-clay already present would be properly evaluated. An effort will be made to explore the possibility of commercial exploration of economic importance.

The results so achieved will provide an indigenous base for the industrial development of Sind Region.

**Summary of the Work Done:**

The investigation of China Clay deposits of Nagar Parkar area revealed that the clay mainly consists of Kaolinite and quartz alongwith minor quantity of goothite, etc. This China clay is generally covered by thin encrustation of

hydrated iron oxides and on top soil layer. The clay zone is of varying thickness, i.e. the clay deposits are in pockets and are of lenticular nature.

The main areas where workable deposits have so far been proved are Paradhoro, Dedhvero, Dungri, Dudwa, Motijo Vandio. The total reserves proved in these areas are of the order of 3.5 million tons.

About 75 samples were collected during the two field sessions for the purpose of detailed analyses with the objective of establishing composition of clay and, more importantly, to ascertain the genesis of these deposits which should prove helpful in directing the future exploration programme.

In addition to study of clay deposits, Karunjhar Hill outcrop of the granties was also mapped on a scale of 1:25000; this helped in understanding the overall geological set up of the area.

The laboratory studies of samples collected have proved that Kaolinite, established both by X.Rays, and D.T.A. studies, forms an average about 2% of the crude clay. The remaining coarser grained fraction consists mainly of quartz, released through decomposition of feldspar of the parent granite. Besides highly decomposed bed rock below the clay horizon are also granites. This established the fact that genesis of these clay deposits is related to the in site decomposition of acid igenous rocks.

The processes of decomposition of granite and neosynthesis of Kaolinite must have advanced under conditions of lateritization and these deposits, in fact, represent lateritic clay development.

The conditions necessary for the promotion of lateritization of granite and the acidic rocks under which Kaolinite is produced are: Sufficient rainfall; moderate drainage with permanant water table, and high temperature.

In the case of China clay deposits under investigation it has been deduced that these conditions were established in the low ground between the Paradhoro-Dehvero granitic ridges in the east and Rampur Dhingano-Chanida ridges in the west. It has been shown that topography was the controlling factor in localizing these deposits in the areas mentioned above.

Evidence has been presented to show that suitable climatic conditions were prevalent in the area during the Plio-Plietocene period when the area was uplifted as a block in response to movement and collision of the Indian plate with Rurasion & Arabian plates.

Based on the controlling factors in the genesis of these laceritic clays established in this study, other possible areas of clay occurances have been

pointed out.

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**Project No.** : C-QU/ENVR (16)

**Project Title** : Behavioural and ecological studies on Rhesus Monkeys with Special Reference to their communication.

**Name of Investigator** : Dr. Qazi Javed Iqbal

**Project Particulars:**

**Duration** : One Year

**Date of commencement** : 1.12.1976

**Date of completion** : 30.11.1977

**Implementing Agency** : Quaid-i-Azam University, Islamabad.

**Total expenditure** : Rs.31,713/-

**Main objectives:** The project envisages behavioural studies on Rhesus Monkeys (*Macaca mulata*) in its natural environment with special reference to motherinfant relationship, group interrelation, aggressiveness, communication etc.

**Summary of the work Done:**

The proposed research was conducted to study the free ranging rhesus monkeys in the natural environment. These studies were aimed at the ecology (population survey, habitat) and behaviours (group interaction, motherinfant behaviour, play behaviour and sexual behaviour). Dunga gali forests were selected as study area. The criteria governing the choice of study site included (i) abundance of animals; (ii) absence of human disturbance; (iii) accessibility. There are about 300 animals in the area ranging from 22-75 animals in each group. Kong's group was selected for behavioural studies. This comprises of 25 individuals. Three high ranking adult males, a lower ranking male and a peripheral male and four adult females (two high ranking, one with infant and one without).

Observations on feeding behaviour show that the monkeys feed on *Vib-*

*ernum nervosum*, *Cornus* (dogwood), *Bergenia*, *ulmus*, *Aschylus leaves*, succulent new tips of *Abies pindrow*, *Arissama jacquemontii* and *Taxus baccata*.

The frequency of interactions among adults is low: a total of 60 interactions occurred in 800 minutes of sample time. Friendly interactions for outweigh other kinds as demonstrated by our data; affiliation interactions 36-109 interactions involving aggressiveness and/or submission behaviour 24-36.

An animal was recorded dominant over another if its approach or threat produced a cover in the other. Sexual behaviour starts in the last week of August and lasts upto end of September. High ranking males copulate with several females. Homo-sexuality occurs between pre-adults and juveniles peripheral males; frequently masterbate during the mating season.

Three types of play behaviour are observed: peer's play, mother-infant play and environmental play. During infancy, mother restraint an infants pushes it towards peer's play and environment play.

*Publication as a result of these Investigations:*

1. Population Survey of rhesus monkeys in the Himalayan foot hills in Northern Pakistan. Abstract submitted; paper read in the National Wildlife Conference, Peshawar.
2. Play behaviour and its role in the social and neuro-psychological development of free-ranging rhesus monkeys (*Macaca mulatta*). Accepted for publication in the Pakistan Journal of Zoology.

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*Project No.* : S-KU/PHYS (13)

*Project Title* : Isotope fraction studies of stable isotopes and diffusion of gases in solids.

*Name of Investigator* : Dr. S.A. Hussain

*Project Particulars*

Duration : Two years

Date of commence : October, 1977

ment

Date of Completion : September, 1979

<b>Implementing Agency:</b>	<b>University of Karachi</b>
<b>Total expenditures :</b>	<b>Rs. 2,61,468/-</b>
<b>Main objectives :</b>	<b>The scheme aims at determining the isotopic abundance, variations of stable isotopes of sulphur, Oxygen, Carbon, Tellurium and plumbium. A number of biological isotope fraction studies will also be conducted.</b>

***Summary of the Work Done:***

The initial experimentation involved fabrication of a reduction line for the purpose of reducing water samples collected from different locations of Karachi Region and then to analyse them from the point of view of isotope fraction process by making measurements of D/H and  $O^{18}/O^{16}$  ratios. For this purpose samples of water have been collected from city area (Spring) rivers, wells (dug) tube wells both of Karachi and the Indus Delta region. Data for twenty samples have been obtained and  $O^{18}/O^{16}$  ratio measurements of twenty one more samples are available and more than thirty samples are in hand for analysis. The region of measurements study of a large number of samples will be able to give interesting results from the point of view of isotope fractionation studies of Hydrogen isotopes and will be helpful in the study and also be able to provide clues for the sources of water in wells, springs, etc.

***Graduate Degrees:***

One M.Phil degree has been awarded.

***B) SECOND ANNUAL REPORTS***

The second annual reports of the following projects were received and processed by the Foundation during the report period:—

<b><i>Project No.</i></b>	<b><i>Title of the Project.</i></b>
<b>P-AU/BIO(86)</b>	<b>Epidemiological Survey and serogrouping at-type strains of leptospirosis in the vertebrate animal in Pakistan.</b>
<b>S-SU/CHEM (65)</b>	<b>Reactions of thionyl chloride with sucrose, trihalose, Methyl-B maltoside -and methyl-B-Lactoside.</b>
<b>SU-EARTH (5)</b>	<b>Exploration and evaluation of the econo-</b>

mic mineral potentials and deposits of nagar Parkar, South Eastern Sind.

S-JPMC/MED (38)

Biochemical studies on Cataractous Human lenses.

C-QU/PHY (20)

To study various interactions in elementary particle physics.

S-KU/PHY (26)

Nonlinear wave propagation in Plasma.

**C) FIRST ANNUAL REPORTS**

The first annual reports of the following projects were received and processed further by the Foundation during the report period:—

*Project No.*

*Title of the Project*

F-FI/BIO (70)

Study of the food habits of Markhor in Chitral Gol.

S-ZSD/BIO (90)

Survey of the reptilian Fauna of Sind.

S-KU/BIO (94)

Bioecological survey of the Indus Delta Estuary.

S-KU/CHEM (10/1)

Structural & Synthetic Studies in some B-Carboline Series.

S-KU/CHEM (96)

Synthetic and isolation studies towards vinblastine and vincristine and their novel derivatives.

S-KU/CHEM (100)

Reactions and Industrial application of orthophenyl-benzaldehyde.

C-GC/EARTH (25)

Resource Potential of Potwar: A study for the identification of Resource management area of growth points.

F-PU/ENVR (9)

Atmospheric and water pollution studies of the urban and industrial areas of Pakistan.

C-AFMC/MED (34)

Mapping of the Chemical constituents of water in Pakistan with a view to correlate



with some of diseases.

**S-JPMC/MED (39)**

**Studies on Insulin levels and its antagonism in diabetic patients.**

**PU-PHYS (11/1)**

**High Energy Phenomenology.**

**C-QU/PHYS (26)**

**Nonlinear wave propagation in Plasma.**

**P-PU/PHYS (30)**

**Trapping levels and mobile charge determinations in thin solid films.**

**CHAPTER -- 3****Organization and Administration**

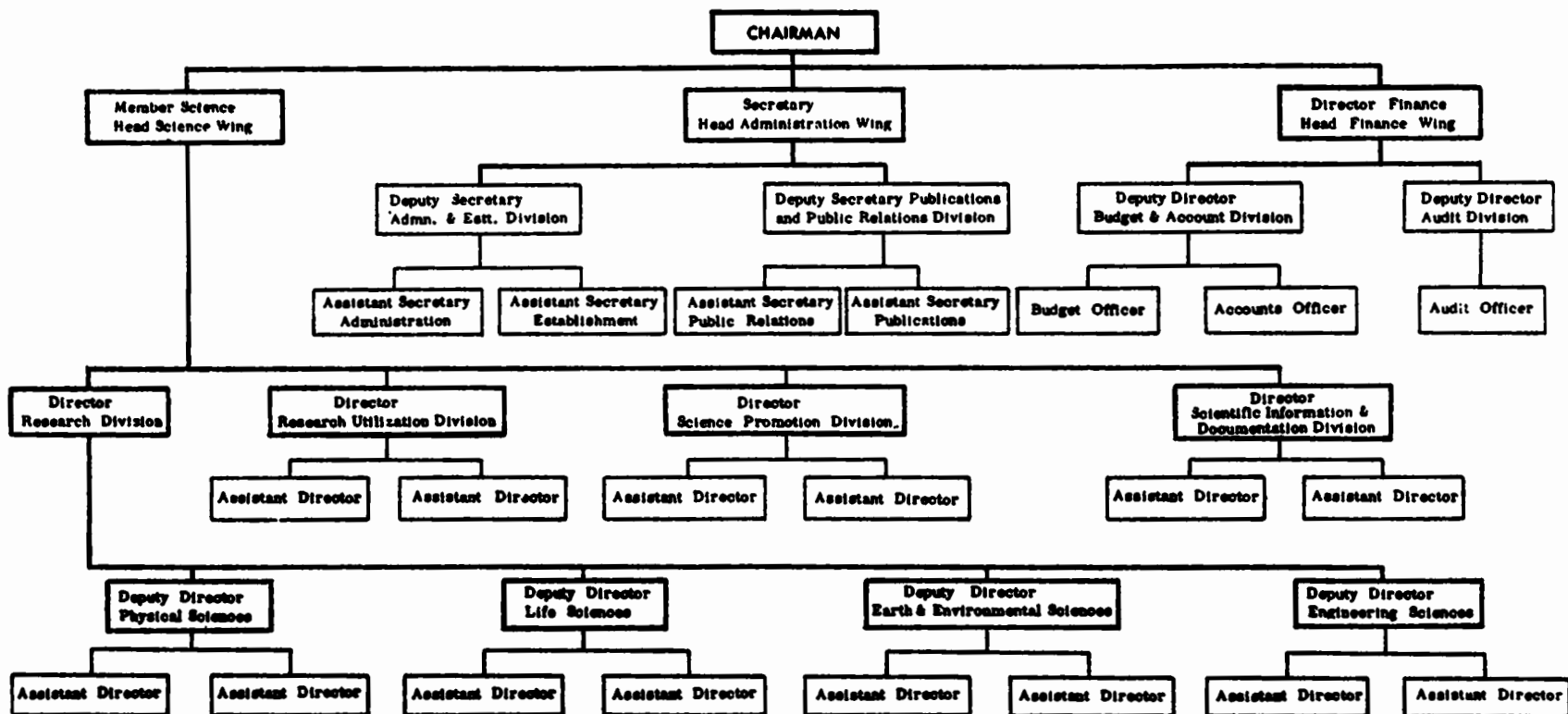
The ultimate organizational and administrative structure of the Foundation is given in the charts on page 43 and 44. The staff in position during the report period is as under:—

**OFFICERS**

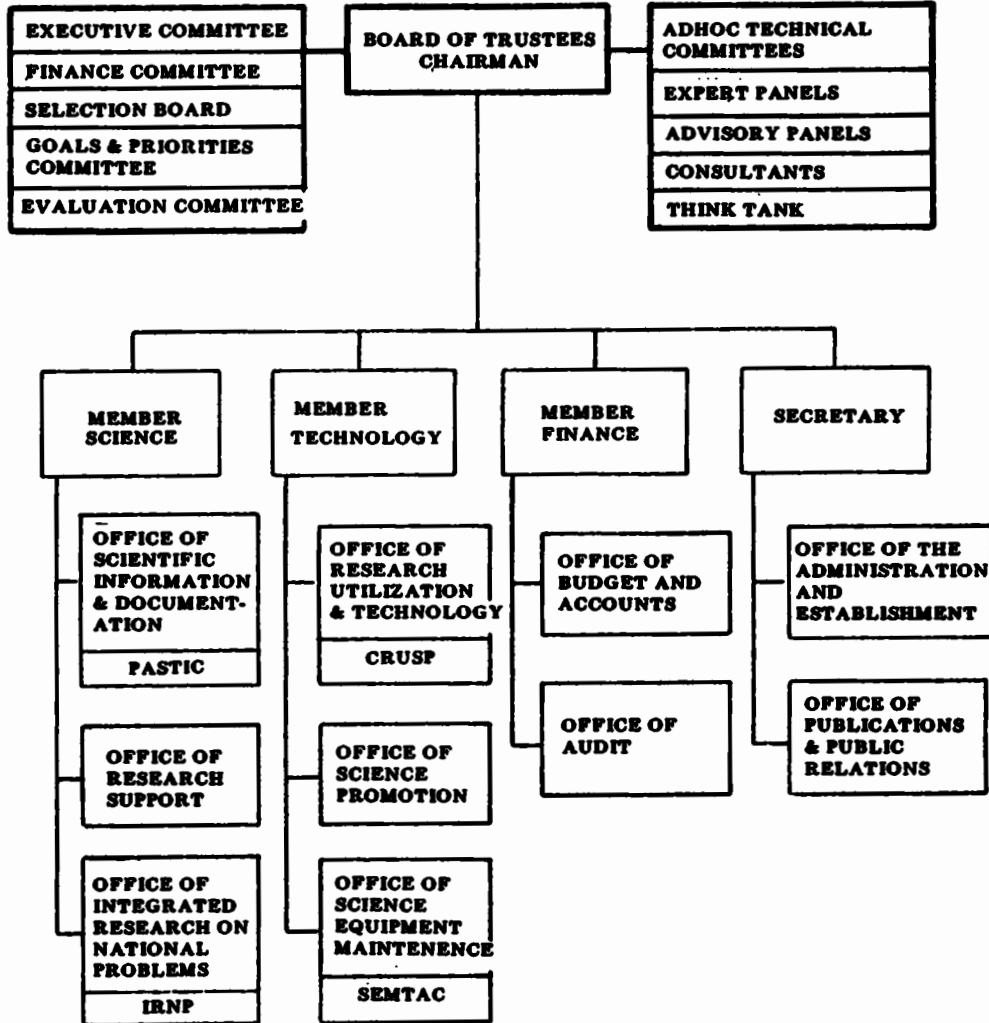
<b>S.No.</b>	<b>Designation</b>	<b>Number</b>
1.	Chairman	1
2.	Member (Science)	1
3.	Member (Finance)	1
4.	Secretary	1
5.	Deputy Director (Finance & Accounts)	1
6.	Senior Scientific Officer	1
7.	Scientific Officer	2
8.	Assistant Scientific Officer	1
9.	Assistant Secretary	1
10.	Accounts & Audit Officer	1
11.	Public Relations Officer	1
12.	Supporting clerical staff.	11
<b>Total:</b>		<b>23</b>

In addition to the whole-time staff Members of the Foundation, there are about 200 scientists and technologists in various Universities/research organizations who are acting in an honorary capacity as reviewers of the research proposals and members of the Technical Committees or Principal Investigators of the PSF supported projects.

## PAKISTAN SCIENCE FOUNDATION ADMINISTRATIVE STRUCTURE



**PROPOSED ORGANIZATION PAKISTAN SCIENCE FOUNDATION**



- PASTIC : PAKISTAN SCIENTIFIC AND TECHNOLOGICAL INFORMATION CENTRE**
- CRUSP : CENTRE FOR RESEARCH UTILIZATION AND SPECIAL PROJECTS**
- IRNP : INTEGRATED RESEARCH ON NATIONAL PROBLEMS**
- SEMTAC : SCIENCE EQUIPMENT MAINTENANCE TECHNICAL ASSISTANCE CENTRE**

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 PAKISTAN

OTHER OFFICES AT KARACHI-LAHORE	TELEGRAMS TELEPHONES	BALANCE
		64241
		68154
		68165

May 21, 1983  
467

The Chairman  
 Board of Trustees  
 Pakistan Science Foundation  
 Q-13, F-7/2,  
 ISLAMABAD.

Dear Sir,

PAKISTAN SCIENCE FOUNDATION  
 ACCOUNTS FOR THE YEAR ENDED JUNE 30, 1981.

We enclose five copies of the balance sheet as at June 30, 1981 and the receipt and expenditure account for the year ended on that date, together with our report thereon, initialled by us for identification purposes. We shall be pleased to sign our report after these have been considered and approved by the Board of Trustees and signed by the Chairman and at least two other members of the Board. Our comments arising from the audit of the Foundation are given in the following paragraphs. The comments appended below were also reported to you through our letter 36 dated January 9, 1983 on June 30, 1980 accounts and being applicable to the year under report have again been reproduced.

2. Accounts

2.1 Liabilities

Although the Foundation operates an unfunded gratuity scheme, no provision has been made in this regard.

2.2 Fixed assets

We have observed that the lease deed in respect of land valuing Rs. 2,853,750

has still not been executed.

### **2.3 Research projects in progress.**

(a) Lists showing totals of research grants in respect of each subject are being prepared currently and until these are prepared it is not possible to segregate grants for projects in progress, completed or abandoned as at June 30, 1981.

(b) We have observed that audit reports of some of the completed projects were not submitted as required by the terms and conditions of the grants disbursed by the Foundation.

### **2.4 Cheques issued and subsequently cancelled.**

Cheques amounting to Rs. 1,094.80 issued during the year ended June 30, 1980 were subsequently cancelled in the year under review.

### **2.5 Cash and bank balance**

The National Bank of Pakistan has confirmed to us a balance of Rs. 691,691 in the name of Pakistan Science Foundation. This balance has not been included in the accounts as it was stated to be the property of the PSF employees contributory provident fund.

## **3. System of internal control.**

### **3.1 Advances**

There is no system to ensure that all advances are properly recorded in the register maintained for this purpose. Due to this weakness, recoveries have not been properly made in some of the cases. We have also not been able to satisfy ourselves whether the balances at the year end reflect a correct position or not.

### **3.2 Fixed assets**

We recommend that the fixed assets record should be maintained in such manner that it indicates value of each item, year of purchase, identification mark and a record of yearly depreciation and the written down value at the end of each year. Fixed assets should be physically verified periodically and agreed to with the fixed assets record.

### **3.3 System of book-keeping**

The books of account of the Foundation are being maintained on a single entry system whereas accounts under review are prepared on a double entry system.

This creates a number of problems inter-alia identification of accruals and prepayments as data is not readily available under single entry system to facilitate the preparation of accounts under double entry system.

#### 3.4 Cash

We have observed that functions of handling and recording of cash are carried out by a single person. This is an undesirable practice and in order to safeguard Foundation's interest, the functions should be segregated.

4. We have noticed that there was no Board of Trustees during the year under report and in the absence of the Board, the Executive Committee was carrying out its functions.

5. We take this opportunity to express our appreciation and gratitude for the co-operation and courtesy extended to us by the management and staff of the Foundation during the course of our work.

Yours truly

Sd/-

Encls

**AUDITORS REPORT**

We have examined the annexed balance sheet of Pakistan Science Foundation as at June 30, 1981 and the annexed receipts and expenditure account for the year ended June 30, 1981 and subject to the contents of paragraphs 2 and 3 of our letter 467 dated May 21, 1983, we report as under:

The receipts of the Foundation during the year ended June 30, 1981 comprise of grant received from the Federal Government.

We are satisfied that the grant so received has been spent on the objects for which it was made, within the specified time limit. There was no un-spent balance after taking into consideration expenses incurred but not paid at June 30, 1981.

We have also satisfied ourselves about the propriety of the disbursements made from the grant.

Sd/-

Chartered Accountants

Rawalpindi, 27th, August, 1984.



**PAKISTAN SCIENCE FOUNDATION  
BALANCE SHEET AS AT JUNE 30,1981**

<b>FUNDS AND LIABILITIES</b>	<b>NOTE</b>	<b>1981 Rupees</b>	<b>1980 Rupees</b>	<b>PROPER- TY AND ASSETS</b>	<b>NOTE</b>	<b>1981 Rupees</b>	<b>1980 Rupees</b>
<b>GENERAL FUND</b>				<b>FIXED ASSETS</b>	<b>4</b>	<b>3,206,920</b>	<b>3,131,860</b>
Balance as at July 1,1980		3,248,341	3,082,641	<b>RESEARCH PRO- JECTS IN PRO- GRESS</b>	<b>2</b>	<b>25,277,021</b>	<b>22,004,396</b>
Prior year adjustment	11	1,095		<b>CURRENT ASSETS</b>			
Receipt and expenditure account surplus for the year		181,195	165,700	Sundry debtors		6,520	4,066
		—	—	Advances,deposits and prepayments	5	267,175	271,700
		3,430,631	3,248,341	Cash and bank balances	6	132,883	4,167
<b>RESEARCH SUPPORT GRANTS</b>	<b>2</b>	<b>25,277,021</b>	<b>22,004,396</b>			<b>406,578</b>	<b>279,933</b>
<b>CURRENT LIABILITIES</b>	<b>3</b>	<b>182,867</b>	<b>163,452</b>				
		<u>28,890,519</u>	<u>25,416,189</u>			<u>28,890,519</u>	<u>25,416,189</u>

49

These accounts should be read in conjunction with the annexed notes

Sd/-  
Chairman

Sd/-  
Trustee

Sd/-  
Trustee

**PAKISTAN SCIENCE FOUNDATION  
RECEIPTS AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED JUNE  
30,1981**

	Note	1981 Rupees	1980 Rupees
Grants received		6,000,000	5,500,000
Less: Grants paid			
Research and institutional support	7	3,272,625	3,055,701
Scientific societies & Professional bodies		405,000	443,150
Scientific seminars & conferences		343,150	124,209
Travel grant for science conferences & seminars		144,023	49,945
Scientist pool subsistence allowance		18,619	39,703
Other functions	8	204,100	213,197
	-----	<u>4,387,517</u>	<u>3,925,905</u>
		<u>1,612,483</u>	<u>1,574,095</u>
Administrative expenses	9	<u>1,445,431</u>	<u>1,411,101</u>
		167,052	162,994
Miscellaneous receipts	10	<u>14,143</u>	<u>2,706</u>
		181,195	165,700

**These accounts should be read in conjunction with annexed notes**

Sd/-  
Chairman

Sd/-  
Trustee

Sd/-  
Trustee

**PAKISTAN SCIENCE FOUNDATION**

**NOTES TO THE ACCOUNTS FOR THE YEAR ENDED JUNE 30, 1981**

**1. Significant accounting policies**

**1.1 Grants received**

Grants received from the Government of Pakistan are accounted for on receipt basis.

**1.2 Fixed assets**

Fixed assets are stated at cost less accumulated depreciation except leasehold land which is valued at cost. Fixed assets acquired for specific research projects are treated as research project expenditure.

**1.3 Depreciation**

Depreciation on fixed assets is charged on reducing balance method on the following annual rates.

	%
Furniture and fixture	6
Office equipment and airconditioners	15
Motor vehicles and bicycles	20
Library books	5

**2. Research support grants**

The grants paid for the performance and execution of the research projects are being carried forward in the accounts of the Foundation and have not been adjusted for completed projects.

### 3. Current liabilities

These consist of the following:

#### Liabilities for expenses

	1981 Rupees	1980 Rupees
Audit fee	30,000	17,000
Scientist pool subsistence allowance	1,500	7,000
Salaries and other benefits	78,207	44,531
Unpaid salary	—	425
Other administration expenses	<u>73,160</u>	<u>77,220</u>
	<b>182,867</b>	<b>146,676</b>

#### Liabilities for other finance

Man biosphere programme	—	14,707
Punjab barani commission	—	1,631
P.C.S.I.R.	—	438
		<b>16,776</b>
	<u><b>182,867</b></u>	<u><b>163,452</b></u>

4. Fixed assets

	COST			DEPRECIATION		
	As at July 1, 1980	Additions/ (Deletions) during the year	As at June 30, 1981	For the year	As at June 30, 1981	Written down value as at June 30, 1981
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Lease hold land	2,853,750	—	2,853,750	—	—	2,853,750
Furniture & Fixture	200,595	6,900	207,495	9,059	65,577	141,918
Office Equipment	135,542	11,219	146,761	9,989	90,156	56,605
Air Conditioners	74,764	—	74,764	3,751	53,503	21,261
Motor vehicles	148,823	111,000	259,823	31,474	133,926	125,897
Bicycles	680	—	680	109	245	435
Library Books	9,217	695	9,912	371	2,858	7,054
<b>Rupees</b>	<b>3,423,371</b>	<b>129,814</b>	<b>3,553,185</b>	<b>54,753</b>	<b>346,265</b>	<b>3,206,920</b>
		(359)				
<b>1980 Rupees</b>	<b>3,247,038</b>	<b>176,692</b>	<b>3,423,371</b>	<b>35,465</b>	<b>291,511</b>	<b>3,131,860</b>

## 5. Advances, deposits and prepayments

	1981 Rupees	1980 Rupees
These are made up of		
Advances to staff	—	6,801
Deposits	4,600	3,700
Prepayments	262,575	261,199
	<hr/>	<hr/>
	267,175	271,700
	<hr/> <hr/>	<hr/> <hr/>

## 6. Cash and bank balances

In hand	1,419	4,015
With bank	131,464	152
	<hr/>	<hr/>
	132,883	4,167
	<hr/> <hr/>	<hr/> <hr/>

## 7. Research and institutional support

Maths and computing sciences	9,875	10,557
Physical sciences	221,873	239,690
Chemical sciences	562,427	894,964
Biological sciences	113,077	611,075
Earth sciences	19,728	69,920
Environmental sciences	96,198	165,732
Engineering sciences	49,050	—
Agricultural sciences	78,195	297,266
Medical sciences	447,109	187,877
Institutional support	1,650,064	98,730
Oceanography	18,779	119,780
Utilisation	—	353,760
Honoraria	6,250	6,350
	<hr/>	<hr/>
	3,272,625	3,055,701
	<hr/> <hr/>	<hr/> <hr/>

## 8. Other functions

	1981 Rupees	1980 Rupees
Scientific centres and herbaria	157,600	142,000
Information and documentation	3,500	41,197
Awards and prizes	23,000	18,000
Scientific surveys and collection of statistics	20,000	2,000
Man and biosphere programme	—	10,000
	<hr/>	<hr/>
	204,100	213,197
	=====	=====

## 9. Administrative expenses

Salaries and other benefits	772,931	855,139
Travelling local	33,168	8,871
Office rental	142,080	118,777
Water, electricity & gas	20,041	16,297
Postage, telephone & telegrams	176,563	249,299
Printing and stationery	13,307	15,636
Vehicle running and maintenance	166,037	52,732
Newspapers and periodicals	6,282	5,652
Liveries and uniforms	3,038	4,914
Entertainment	23,812	12,926
Repairs and maintenance	8,177	6,474
Depreciation	54,753	35,465
Miscellaneous expenses	5,244	4,388
	<hr/>	<hr/>
	1,425,433	1,386,570
Audit fee	13,000	12,500
Advertisement	5,226	6,187
Legal expenses	1,772	5,844
	<hr/>	<hr/>
	1,445,431	1,411,101
	=====	=====

**10. Miscellaneous receipts**

**This includes old balances written back amounting to Rs.12,493 (1980: nil)**

**11. Prior year adjustment**

**This represents cheques issued during the year ended June 30, 1980 and cancelled subsequently.**

**Sd/-  
Chairman**

**Sd/-  
Trustee**

**Sd/-  
Trustee**



**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 provisions of this Act, to acquire, hold and dispose of property, both movable and immovable, and shall by the said name sue and be sued.

(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 for:

- (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, museum, 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 or technology in particular;
- (vi) the organisation of periodical science conferences, symposia and seminars;
- (vii) the exchange of visits 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;
- (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 decision 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 to the Chairman or the Executive Committee such of its powers and functions as it may consider necessary.

12. **ADHOC COMMITTEE:** 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 Government;
- (b) donations and endowments; and
- (c) income from other sources.

14. **BUDGET:** The Foundation shall cause to be prepared and approve a statement of its receipts and expenditures 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 to 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 REPORT:**(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.

## ANNEXURE-II

## LIST OF SANCTIONED RESEARCH GRANTS 1980 - 1981.

S.No. List of Schemes	Amount Sanctioned	Name of Principal Investigator and Organization supported
<b>1. AGRICULTURAL SCIENCES</b>		
Pathology of Trees (Diseases of Conifers) P-AU/AGR(55/1)	23,817/- (6-months)	Dr. Abdul Hamid Khan, Department of Botany, University of Agriculture Faisalabad.
<b>2. BIOLOGICAL SCIENCES</b>		
Investigation on wood anatomy of Conifers & Polysaccharide Components of Euclyptus Poplars etc. S-KU/BIO (14/1)	1,46,932/- (2 years)	Dr. Mahmood Ahmad, Department of Botany, University of Karachi, Karachi.
<b>3. CHEMICAL SCIENCES</b>		
Characterization and Production of enzymes of Chemical importance. S-KU/Chem (27/1)	67,973/- (1-year)	Dr. M.I.D. Chughtai, Institute of Chemistry, University of Karachi Karachi.
Kinetic, Electrochemical & Optical investigation of Bipyr- idilium Herbicides and related compounds. C-QU/Chem (73/1)	44,400/- (3 years)	Dr. Mahboob Muhammad, Department of Chemistry, Quaid-i-Azam University, Islamabad.
Isolation & Structural studies on the Chemical Constituents of some Indigenous Flowering Plants. S-KU/Chem (84/1)	44,600/- (1 year)	Dr. Viqar-ud-din Ahmad, HEJ Post-Graduate Institute of Chemistry, University of Karachi.

- Synthesis of Model  $\alpha$ -Methylene lactones & their application to the Synthesis of Biologically active naturally occurring  $\alpha$ -Methylene Lactone sesquiterpenes.  
P-PU/Chem (104) 1,08,220/- Dr. Abdul Rehman, Institute of Chemistry, Punjab University, Lahore. (3-years)
- Phosphorous Intermediates in the Synthesis of Pesticides.  
C-QU/CHEM (114) 96,338/- Dr. S.U. Sheikh, Department of Chemistry, Quaid-i-Azam University, Islamabad (1-year)
- Application of Volatile metal Complexes of some new Schiff bases. S-SU/Chem (116) 2,17,520/- Dr. Iftikhar-ud-Din Arain, Director, Institute of Chemistry, University of Sind, Jamshoro. (2-years)
- Silicones from locally available silicate mineral.  
C-QU/CHEM (122) 51,800/- Dr. Muhammad Mazhar, Department of Chemistry, Quaid-i-Azam University, Islamabad. (1-year)
4. Engineering Sciences
- Design and development of electric passenger train.  
F-PU/Eng (15) 70,700/- Dr. M. Abdullah/Mr. Inamur-Rahim, Faculty of Engineering University of Peshawar, Peshawar. (2 years)
5. Mathematics & Computing activities:
- Existance & Properties of generalised free products of certain group amalgams.  
P-PU/MATH (13) 19,750/- Dr. Abdul Majeed, Deptt. of Mathematics, University of the Punjab, Lahore. (1 year)
6. Medical Sciences
- i. Control of Leishmaniasis in Baluchistan Area.  
F-AFM/Med (46) 31,000/- Col. Dr. Ishfaq Ahmad, AFM College, Rawalpindi. (2-years)

- |       |  |                                 |  |
|-------|--|---------------------------------|--|
| ii.   | <b>Cholelithiasis and incidence of Carcinoma in gall bladder diseases. P-SGR/Med (48)</b>                                  | <b>1,61,480/-<br/>(2-years)</b> | <b>Prof. Khalida Usmani, Sir<br/>Ganga Ram Hospital, Lahore.</b>   |
| iii.  | <b>High Altitude Medical Research Project - Changes in Renal Functions. P-PMI/MED (49)</b>                                 | <b>40,500/-<br/>(3-months)</b>  | <b>Dr. Farakh A. Khan, Director<br/>Faculty of Surgery, Post-graduate Medical Institute,<br/>Lahore.</b>                           |
| iv.   | <b>Prevalence &amp; Prevention of tuberculosis in children. F-AMC/MED (50)</b>   | <b>88,800/-<br/>(1 year)</b>    | <b>Dr. Faiz Muhammad, Assistant Professor, D.H.O. Hospital and Ayub Medical College, Abbottabad.</b>                               |
| v.    | <b>Role of Calcium in renal stone formation in Pakistan. P-PMI/MED (53)</b>  | <b>1,59,140/-<br/>(2-years)</b> | <b>Dr. Farakh A. Khan, Director<br/>Faculty of Surgery, Post-graduate Medical Institute, Lahore</b>                                |
| vi.   | <b>Hormonal level and secretory patterns in rhesus monkeys with induced polycystic ovaries. C-QU/MED (55)</b>              | <b>64,010/-<br/>(1 year)</b>    | <b>Dr. M. Arslan, Professor,<br/>Department of Biology,<br/>Quaid - i - Azam University<br/>Islamabad.</b>                         |
| vii.  | <b>Epidemiological study of the orbital tumours in Mayo Hospital, Lahore. P-MHL/MED (57)</b>                               | <b>64,200/-<br/>(2-years)</b>   | <b>Dr. Muhammad Munir-ul-Haq,<br/>Professor of Ophthalmology,<br/>King Edward Medical College<br/>&amp; Mayo Hospital, Lahore.</b> |
| viii. | <b>To study the Prevalence Clinical presentation and Management of Juvenile-Rheumatoid Arthritis J.R.A. S-DMC/MED (67)</b> | <b>3,32,038/-<br/>(2 years)</b> | <b>Prof. Saleh Memon, Prof.<br/>of Medial Unit and Head<br/>of Medicines, Civil Hospital<br/>Karachi.</b>                          |
| ix.   | <b>Study of Vital Respiratory disease in Children in Rawalpindi/Islamabad. C-NIH/MED (69)</b>                              | <b>1,54,360/-<br/>(2 years)</b> | <b>Dr. Abdul Ghaffar, Chief<br/>Public Health Division, National Institute of Health,<br/>Islamabad.</b>                           |



## ANNEXURE-III

## Institutional Support

S.No.	Institution	Amount sanctioned.
1.	University College of Engineering Taxila	Rs. 1,00,000/-
2.	Sind Agriculture University, Tandojam.	Rs. 1,50,000/-
3.	Sind University, Jamshoro	Rs. 1,00,000/-
4.	University of Azad Jammu & Kashmir, Muzaffarabad.	Rs. 1,50,000/-
5.	Gomal University, D.I. Khan	Rs. 1,14,000/-
6.	Bahauddin Zakariya University Multan (Material Sciences & Engineering Deptt.)	Rs; 5,000/-
7.	Government College for Women, Gujranwala	Rs. 20,000/-
8.	Viqar-un-Nisa College for Women, Rawalpindi.	Rs. 25,000/-
9.	Government College for Women, Rawal- pindi.	Rs. 30,000/-
10.	Nuclear Research Laboratory, Government College, Lahore.	Rs. 1,25,000/-
11.	Institute of Chemistry, Punjab University Lahore.	Rs. 1,28,564/-
12.	NWFP Agriculture University, Peshawar	Rs. 1,00,000/-
13.	Baluchistan University, Quetta	Rs. 1, 50,000/-
14.	NWFP University of Engineering and Technology, Peshawar	Rs. 1,16,000/-

15.	<b>Bahauddin Zakariya University, Multan</b>	<b>Rs. 1,00,000/-</b>
16.	<b>Karachi University, Karachi</b>	<b>Rs. 1,00,000/-</b>
17.	<b>Director of Education (NWFP) for College with P.G. Studies, Peshawar.</b>	<b>Rs. 1,50,000/-</b>
	<b>Total:</b>	<b>Rs. 16,640,64/-</b>

## ANNEXURE-IV

**Grants Sanctioned for Scientific Societies  
and Learned Bodies for achievement of  
their objectives:**

<b>S.No.</b>	<b>Agency</b>	<b>Grant in Rupees</b>
1.	Pakistan Association for the Advancement of Sciences.	40,000/-
2.	Scientific Society of Paksitan	40,000/-
3.	Pakistan Academy of Sciences	50,000/-
4.	Pakistan Association of Scientists and Scientific Professions.	40,000/-
5.	Biological Society of Pakistan	10,000/-
6.	Sind Science Society	25,000/-
7.	Pakistan Institute of Chemical Engineers.	15,000/-
8.	Pakistan Institute of Metallurgical Engineers.	10,000/-
9.	Pakistan Society of Biochemists	10,000/-
10.	Pakistan Medical Association	20,000/-
11.	Institute of Electrical Engineers.	15,000/-
12.	Pakistan Institute of Physics	10,000/-
13.	Energy Society of Pakistan	10,000/-
	<b>Total</b>	<b>2,95,000/-</b>

## ANNEXURE-V

## GRANTS SANCTIONED FOR PUBLICATIONS PROGRAMME

S.No.	A g e n c y	Name of Publication	Grant in Rupees
1.	Pakistan Association for the Advancement of Sciences.	i) Pakistan Journal of Sciences.	20,000/-
		ii) Pakistan Journal of Scientific Research.	15,000/-
2.	Scientific Society of Pakistan	i) Science Bachoon Ke-Liya.	30,000/-
		ii) Jadeed Science	
3.	Biological Society of Pakistan	Biologia	10,000/-
4.	Pakistan Society of Biochemists	Pakistan Journal of Biochemistry	5,000/-
5.	Pakistan Forest Institute, Peshawar.	Pakistan Journal of forestry	10,000/-
6.	Faulty of Veterinary Sciences, University of Agriculture, Faisalabad.	Pakistan Veterinary Journal.	10,000/-
7.	Pakistan Institute of Chemical Engineers.	Journal of Pakistan Institute of Chemical Engineers.	10,000/-

**Total: Rs. 1,10,000/-**

## ANNEXURE-VI

GRANTS SANCTIONED FOR ORGANIZING SCIENCE CONFERENCE/  
SYMPOSIA/SEMINAR

S.No.	A g e n c y	Object	Amount
1.	Energy Society of Pakistan	National Energy Conference 1981	Rs.10,000/-
2.	Scientific Society of Pakistan	20th Annual Science Conference	Rs.40,000/-
3.	Allama Iqbal Open University, Islamabad	National Statistical Conference	Rs.10,000/-
4.	M/O Science & Technology	Symposium on Islam in Science	Rs.15,000/-
5.	Quaid-i-Azam University, Islamabad	School on Physics of Mixed Solids	Rs.10,000/-
6.	Centre of Excellence in Water Resources Engineering, University of Engineering & Technology Lahore.	Application of Remote Sensing to Water Resource Development and Management.	Rs.10,000/-
7.	Appropriate Technology Development Organization	Village level Sugarcane Processing	Rs.10,000/-
8.	Institute of Engineers, Pakistan	Seminar on "Role of Scientists & Engineers in the improvement of productivity	Rs.10,000/-
9.	Appropriate Technology Development Organization	i) Bio gas Technology ii) Dehydration and preservation of fruits & vegetables.	Rs.25,000/-

Total. Rs. 1,40,000/-

## ANNEXURE-VII

## TRAVEL GRANTS FOR VISIT ABROAD

S.No.	Name & Address	Conference/Seminar	Amount sanctioned.
1.	Mr. Abdul Rauf Nowshervi Chemistry Department, University of Peshawar	International Symposium on Solar Energy Utilization, Ontario, Canada.	Rs. 2,302/-
2.	Dr. S.I. Ali, Professor of Botany, University of Karachi Karachi.	International Botanical Congress, Sydney.	Rs.22,990/-
3.	Dr. Shahid H. Bokhari, Department of Electrical Engineering, University of Engineering & Technology, Lahore.	10th International Con- ference on Parallel pro- cessing, U.S.A.	Rs.20,390/-
4.	Dr. Munir-ul-Haque, Prof. of Ophthalmology, KEMC, Lahore.	4th International Sym- posium on Orbital dis- orders, Amsterdam.	Rs.19,454/-
5.	Dr. S.U. Sheikh, Department of Chemistry, Quaid-i-Azam University, Islamabad.	Fourth Euroanalysis Conference, Finland.	Rs.22,471/-
6.	Mr. Hamid Ahmad, Senior Research Officer, PCSIR Laboratories, Lahore.	International Symposium on Food Technology in the developing countries, Kuala- lumpur.	Rs.35,000/-
7.	Dr. Miss. K.M. Elahi, Chairman, Deptt. of Geography, University of Punjab, Lahore.	International Geographical Conference, Tokyo, Japan	Rs.17,842/-
8.	Dr. Saleh Memon, Professor of Medicine, PMC, Karachi.	International Congress on Tropical Disease and Malaria, Manila.	Rs.16,202/-
9.	Dr. Khairat Ibne-Rasa, Vice Chancellor, University of Punjab, Lahore.	25th Session of the Inter- national Seminar on Univ- ersity Today, Yougoslavia.	Rs.17,200/-