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SCIENCE EDUCATION IMPROVEMENT PROJECT

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PROJECT COMPLETION REPORT

Prepared by the NSF Science Liaison Staff, New Delhi

TABLE OF CONTENTS

			Page
Preface			1
Section I	--	Goals and Objectives	4
Section II	--	Fiscal Inputs	19
Section III	--	Activities	23
Section IV	--	Evaluation	72
Section V	--	Recommendations	85
Section VI	--	Annexures	
Appendix	A	USAID Funding Documents	92
	B	Trust Fund Authorizations	94
	C	NCSE Rupee Expenditures	95
	D	ICTE Rupee Expenditures	106
	E	NSF Science Liaison Staff	107
	F	U.S. Educational materials used in Summer Institutes.	113
	G	Summary of Summer Institutes	115
	H	U. S. Consultants	122
	I	U. S. Invited Travellers	163
	J	Publications and Teaching Aids	173
	K	Participants at Chemistry Conference	181
	L	Participants at Physics Conference	184
	M	Participants at Life Science Conference	188
	N	Participants at Mathematics Conference	194
	O	NCSE Panel Members	198
	P	Participant Trainees	208

PREFACE

The Science Education Improvement Project was a project jointly funded by the U. S. Agency for International Development and the Government of India and jointly managed by the National Science Foundation and counterpart agencies including the National Council for Science Education, the University Grants Commission, and the National Council of Educational Research and Training. This report has been prepared by the NSF Science Liaison Staff in New Delhi in accordance with the relevant Manual Order and instructions from the AID Mission. It attempts to address that assignment directly without attempting to answer a number of other questions which might have been asked. Only a few gratuitous comments are included and those are here in the preface.

The difficulties encountered by anyone attempting to introduce changes into a traditional society are formidable, the more so when these changes are with respect to a traditional pattern of education. In the U.S., with its much vaunted progressive approach to education, the task of changing a curriculum is often compared with that of moving a grave yard -- the obstacles are enormous. In India attempting to introduce changes is a challenge for the bravest. With rapid expansion of an educational system there often is a lowering of standards. The teacher is impelled to adhere even more closely to the obsolete syllabus. The very effort to maintain educational standards often becomes an obstacle to needed change.

Fortunately there are many who have faced the enormous challenge with a constructive response. The Science Education Improvement Project (SEIP) has provided a mechanism through which such persons in Government and in local institutions have been able to face the task of implementing science education improvement. In this process many Indian and U.S. scientists and teachers of science have been brought together in professional relationships which transcend the life of the project. The overwhelming majority of those involved have gone out of their way to confirm their interest in continued involvement. Thus, the project has been remarkable successful in invigorating the enthusiasms of a very large number of the key persons involved with science education. More than that, the stated goals of the project have been achieved in significant measure.

The overall success of the SEIP can be judged from the fact that there continues a self-sustaining national program for the training of science teachers at the conclusion of U.S. assistance. The summer institutes have been improved and adapted to local needs; the pioneering project in school development is generating materials including textbooks and teachers guides which are published in five different languages and are in use in one of the largest school systems in the world; the college development activity has expanded at a significantly greater rate than anticipated; a large number of novel science teaching kits and materials are now manufactured in India.

In addition there have been improvements in various institutions. The University Grants Commission (UGC) has incorporated a number of new national programs into its own program. The National Council of Educational Research and Training (NCERT) has assumed direct responsibilites for an expanded summer institute program. The Association for Principals of Technical Insituteisions has become the Indian Society for Technical Education.

The conspicuous failure of the SEIP is the failure of the National Council for Science Education (NCSE) to become a viable institution. As the project draws to a conslusion the question of whether or not the NCSE should become an officially recognized body is still pending in the Ministry of Education. For the third time the question is under active consideration. On two earlier occasions Ministers of Education have recommended that the NCSE become a registered society only to have the decision reversed when they were succeeded by new Ministers.

The following report includes a statement of goals and objectives; fiscal inputs; project activities; an evaluation of outputs; and recommendations. Other material either required by the Manual Order or relevant to the narrative presentation is included in a series of annexes.

SECTION I -- GOALS AND OBJECTIVES

A. Introduction

The Science Education Improvement Project had its antecedents in the summer institutes which were first supported by AID in 1974. Prior to this date* the University Grants Commission had organized independently a few summer institutes for science teachers and in 1963, UGC supported four summer institutes for high school teachers. From 1964 through 1966 the summer institute program expanded rapidly with support from AID - encompassing the fields of biology, chemistry, engineering, mathematics, physics and polytechnic education. In addition to the University Grants Commission, the National Council of Educational

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* The summer institute activity in India appears to have started in 1958 by a group of concerned mathematicians at Delhi University. They received encouragement and a small grant (Rs. 1750) from an officer of the UGC who had previously been an invited visitor to NSF summer institutes in the U.S. Participants in this and the succeeding institutes were college teachers of mathematics but special attention was given to problems of teaching mathematics in the schools by inviting school teachers to participate in the final three days of the program. Evidence of the seriousness of purpose is found in the fact that this group translated and mimeographed the Bourbaki Volumes on Modern Mathematics. This series of summer institutes continued through the summer of 1962.

Research and Training and the Association of Principals of Technical Institutes supported this activity. The summer institutes were six-week inservice training workshops held during the summer break in the academic year. AID, through four different university contractors, provided the services of a number of U.S. school and college science teachers who assisted in the organization and presentation of the various programs.

With respect to the goal of introducing new materials into Indian classrooms, summer institutes were largely a failure. Indian teachers are not free to depart from rigidly prescribed syllabi and these summer institutes frequently made use of materials not included in the syllabi. On the other hand the institutes elicited enthusastic responses from virtually everyone involved with them. It was clear that the cross-cultural interaction which was an important feature of the summer institutes was highly stimulating. However, improved strategies would have to be employed if the summer institutes were to propagate identifiable benefits to local classrooms. In this connection the National Science Foundation was asked by AID to assist in designing and implementing a "follow-up" program to improve

the yield of future summer institutes.

In 1966 a prestigious gathering was assembled at the UGC. The U.S. President's Science Advisor, Dr. Donald Horning, read out a greeting from the President of the United States. A delegation including members of the National Science Board received an advance invitation for NSF to become involved in science education developmental activities in India. During the following month, NSF participated in a program planning conference held in Srinagar. On that occasion the elements of the current comprehensive program which came to be known as the SEIP were identified.

B. The Original Comprehensive Plan

In the discussion of the "follow-up" program, it became quite clear that a three-fold effort would be required to improve the teaching of science in Indian classrooms. Teacher training through the summer institutes was only a part of the job. Improved teaching materials developed in India were urgently needed and the institutions responsible for education would have to be encouraged to endorse the experimental use of new materials. The deliberate strategy of the planning conference was to build flexibility into the

project. It was deemed important for the program to respond to the creativity which it stimulated and to correct its own course. Under the rubric of "special projects" key persons could be brought together to identify further the optimum course of the project.

In the original concept, the program was to be subject to the guidance of national advisory committees in each of the various disciplinary areas. Implementation would be through a body which could receive proposals and sanction grants for the support of science education development projects in each of the areas of activity described below. This was the conceptual origin of the National Council for Science Education and its national advisory panels.

The following activities were recommended.

1. Summer science institutes
2. College development
3. School development
4. Materials development
5. Special projects.

1. Summer Science Institutes

The planning conference recommended a continuation of the summer institute activity to provide a unique opportunity for junior teachers to participate in training programs involving senior teachers and scientists. Increased use of

teaching materials developed locally and increased involvement of local experts also were recommended. The institutes were viewed as an important instrument for enlisting the interest and enthusiasm of teachers who would be called upon to teach up-dated syllabi and prepare students to take revised examinations.

The original summer institutes for secondary school teachers of mathematics and science depended heavily on curriculum "packages" developed in the United States -- integrated sets of textbooks, teachers' guides, lab manuals, kits of equipment, films and other teaching aids. The conference recommended that summer institutes offer training of greatest use to participating teachers, particularly as new topics were added to the syllabus and old ones were deleted.

2. College Development

The planning conference recommended that strategic use be made of the affiliating relationship between universities and colleges in the institute "follow-up" program. Since the university sets the syllabus and final examination for all of its affiliating colleges, any change in the teaching of science authorized by the university would affect simultaneously all the colleges affiliated to that university. Thus the natural

module of change was a single university science department and the corresponding departments in its affiliating colleges. On the average there are approximately 50 colleges affiliated to each university. The conference recommended that a program supporting such modular changes be included in the comprehensive plan. It was proposed that selected university departments be encouraged to develop plans for upgrading the teaching of their disciplines and that summer institutes be used to retrain teachers from the affiliated colleges which would be affected by changes in the syllabus or examination. A coordinated program to improve libraries and laboratories in the local colleges was part of the recommended college development effort.

3. School Development

The planning conference gave its attention to possible mechanisms for changing school level education. It was noted that boards of study preside over the syllabi and examinations and that directors of public instruction manage school systems through a hierarchy of inspectors and sub-inspectors. Any real change in the teaching of science in the schools could be expected only in those jurisdictional areas in which the authorities welcomed and encouraged the intended change.

Without official encouragement, individual teachers could make very little use of the lessons they might have learned by participating in summer institutes. The planning conference recommended that support for the improvement of school level education be concentrated in those systems which had progressive leadership and which welcomed support for systematic changes.

4. Materials Development

The planning conference recognized that improved teaching materials of every category were urgently needed. This need embraced textbooks, teachers' guides, laboratory manuals, equipment kits, charts and other visual aids. While U.S. curricular materials were often useful models, they usually could not be used without adaptation. In the field of polytechnic education, there were a number of areas in which syllabi had never been established. The materials development support recommended by the planning conference encouraged various initiatives.

5. Special Projects

Recognizing the importance of maintaining a capacity to respond to project developments, the planning conference explicitly recommended that a category of special projects,

to be defined later, be included in the comprehensive plan.

C. Restatement of Goals

Throughout the life of the project, the constant goal has been the improvement of teaching science. The original Non-Capital Project Paper called for the creation of the National Council for Science Education, continuation of the summer institutes, and the undertaking of the additional program activities recommended by the conference. Subsequently the emphasis on assisting with the establishment of the NCSE declined and science curriculum development -- broadly construed -- became the principal focus.

In the Non-Capital Project Paper dated 7/10/69, science education was understood to cover primary, secondary and collegiate levels of mathematics, the physical sciences, the life sciences, engineering and polytechnic subjects. The three-fold approach emphasized training of personnel, institutionalizing project activities and developing new teaching materials. In-country training through summer institutes and other short training programs and in-US training through AID Participant Training were objectives. Institutional development was to be centered in the various

agencies responsible for science education in the Center, in States, and in Municipal Corporations. The development of new teaching materials was recommended.

A Non-Capital Project Paper Review dated 1/6/70 called for an accelerated phase-out of AID/NSF support of the summer institutes. NCERT was chosen to take the lead in the SEIP and emphasis was to be given to the production and trial use in schools of new materials developed by the various NCERT Study Groups.

The Non-Capital Project Paper dated 9/17/70 defines essentially the same goals as those of 7/10/69 but gives added weight to the development of an indigenous capacity for supporting continuous curriculum reform. The Indian Society for Technical Education is recognized as a successor to Association of Principals of Technical Institutions in the role of coordinating subproject activities in technical education.

On 3/12/71 a Revised Non-Capital Project Paper specified a greater concentration on the institution building phase of the project and the dropping of all support for polytechnic and engineering subprojects.

D. Project Logical Framework Targets

On November 19, 1971 the document called the Project Logical Framework was issued by AID. It covers the period from January 1, 1971 to December 31, 1975 and includes a quantitative projection of outputs in terms of trained staff, institutional programs, and improved materials. The Project Logical Framework specifies conditions expected at the end of the Project. Figure 1 gives a pictorial summary of these goals.

1. Trained Staff

While training may occur during an in-country training program or through on-the-job experience, the Project Logical Framework specified that only returned AID Participant Trainees be counted for purposes of inventorying trained personnel. An analysis of the Participant Training activities will appear in Section IV of this report (pages 79-[illegible]).

The table below gives the magnitude of annual outputs of trained staff expected from the DEIP and is taken directly from the Project Logical Framework.

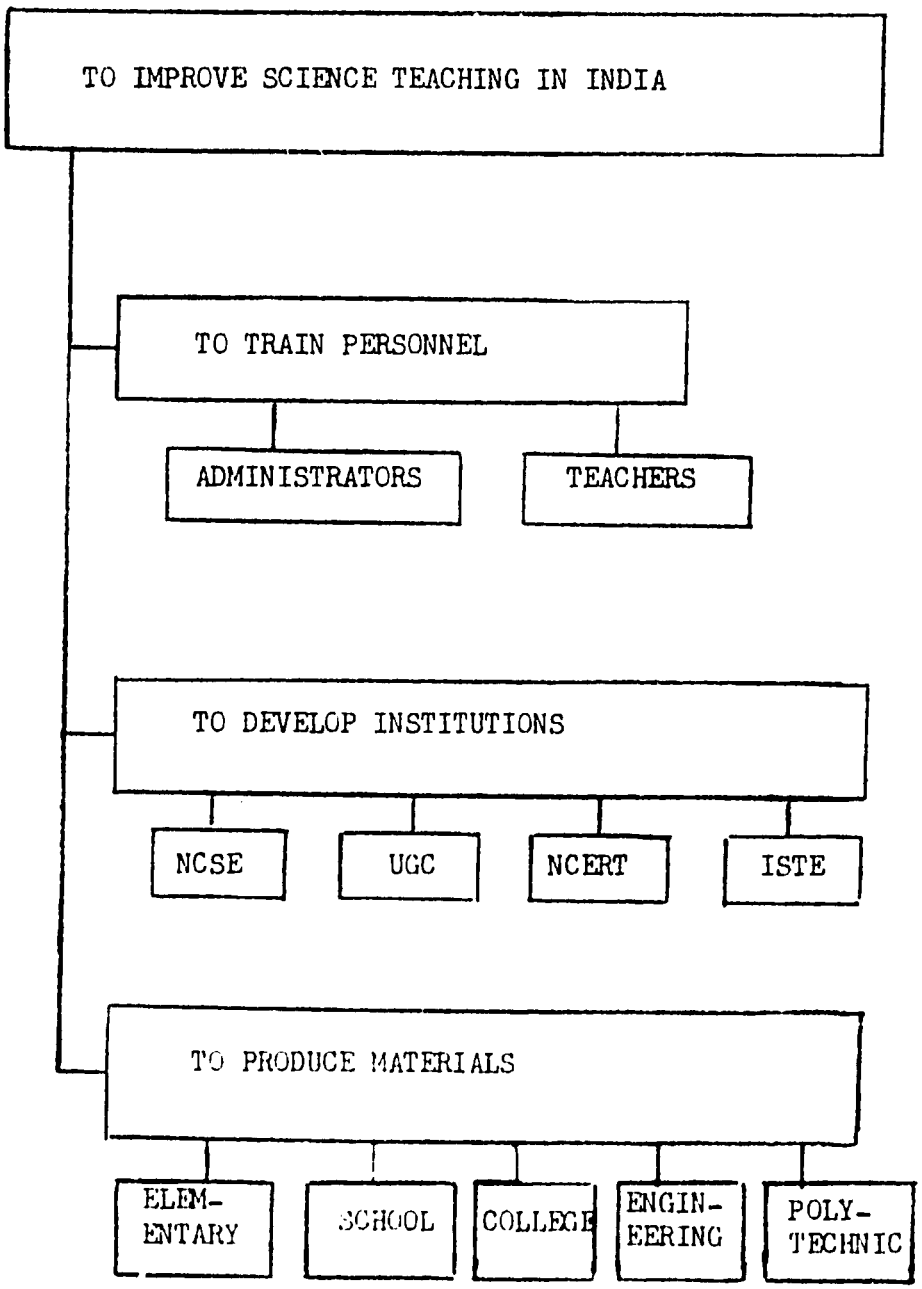


FIGURE 1. THE GOALS OF THE SCIENCE EDUCATION IMPROVEMENT PROJECT

Staff

"NCSE	- 5 :	Prog. Coordinator (1); Sc. Mat./Spec. (4)
UGC	- 5 :	COSIP Administrator (1); COSIP Supv. (4)
NCERT	- 2 :	Prog. Coord. (1); Sc. Materials Sp. (1)
Bombay (BMC)	- 2 :	Elementary Curriculum Specialists
Mysore (RCE)	- 2 :	Elementary/Secondary Curriculum Specialists
Rajasthan (Ajmer)	- 2 :	Elementary/Secondary Textbook Writers
CSC (Delhi)	- 2 :	Elementary/Secondary Curriculum Specialists"
	22	

BMC = Bombay Municipal Corporation
RCE = Regional College of Education
CSC = Central Schools Commission

7. Institutional Development

The Project Logical Framework acknowledge three institutions which have played key roles in the SEIP through planning, funding, and evaluating subproject activities. There are the National Council for Science Education, the University Grants Commission, and the National Council of Educational Research and Training. The Indian Society for

Technical Education is not mentioned in the Project Logical Framework.

NCSE was established in 1966 through an instruction issued by the Secretary of the Ministry of Education. Direct support from the NCSE has been given to SEIP activities not coming under the purview of other agencies.

The UGC is a statutory body which provides development grants to universities. In addition the UGC announces various programs from time to time. The summer institutes for college teachers and other activities of the SEIP concerned with college level education are sponsored by the UGC.

The NCERT is also a statutory body consisting of a large number of departments and is generally concerned with all phases of school-level education. This agency has supported a number of curriculum development activities including the Study Groups Project and the UNESCO Project. The four Regional Colleges of Education are under the purview of NCERT.

The table below is taken from the Project Logical Framework and gives the magnitude of outputs with respect to institutionally supported programs.

Institutions:

"NCSE - Coordinates/evaluates all SEI higher secondary/college SSI teacher retraining programs.

UGC - Maintains/coordinates (4) mathematics (3) physics (3) Chemistry and (2) biosciences COSI Programs per year.

NCERT - Maintains two (2) RCE Curriculum Development units (Mysore, Ajmer) per year."

COSI Programs = College Science Improvement Programs

3. Improved Materials

Each of the key agencies with whom the NSF liason staff has worked has sought to encourage the design, development, production, use, and evaluation of new science curricular materials. The Project Logical Framework gives the following output targets.

Materials

"NCSE - Teacher retraining materials developed, disseminated and tested in 200 MOE supported summer retraining institutes.

UGC - University and college partners under COSIP program have developed and tested new math/science curricula in 12 programs noted above.

NCERT - a. BMC elementary materials produced, adjusted, adopted for use in 200 schools by 1975.

b. RCE-Ajmer and State Institute of Science Education Class III-VIII science/math texts produced for use in 50 schools by 1975.

c. RCE Mysore and SISE Bangalore elementary/secondary materials produced for 20-25 schools by 1975.

d. Central Schools Commission (CSC) New Delhi: Class 1-8 teaching materials prepared for 5 pilot and 130 English media schools by 1975; materials augment class 9-11 materials developed by NCERT/UNESCO."

BMC = Bombay Municipal Corporation
COSIP = College Science Improvement Program
MOE = Ministry of Education
SISE = State Institute of Science Education

In Section IV an evaluation of project performance will be made using the Project Logical Framework standards as the yardstick of performance. In Section III an overview of project activities will be given. The next section gives an account of fiscal inputs by both governments.

SECTION II -- FISCAL INPUTS

In this section of the report it was hoped that a complete report on the fiscal inputs to the SEIP including both the contributions of AID and the Ministry of Education could be given. In the limited time and manpower resources available at the time this report is written this proves to be a difficult task. However, the available information is included and is worthy of close inspection.

A. Dollar inputs from AID

The project received an original grant of $100,000 from AID. Although the intention was to provide for the dollar commodities for a program which would continue for five years or more, it was necessary to make a complete specification of requirements almost before the comprehensive program got underway. Some of the items were needed to establish the operation of the NCSE and the NSF Science Liaison Staffs. Science teaching equipment for which there was an explicit anticipated use as prototypes for possible Indian manufacture, or for the implementation of sub-projects was also included. The implementing document was Project Agreement number 131, dated Nov 1, 1966.

Through a series of funding documents listed in Appendix A_____, $4,073,839 has been made available for the operation of the program. With the exception of $31,000 earmarked for support of the Participant Training program and $143,500 for commodities, this money has been allocated for dollar costs of staff and consultants.

B. Rupee inputs from the Trust Fund

The rupee costs of operating the SEIP have come from the Trust Fund as authorized in the Program Agreements and corresponding PIO/Ts. Details are given in Appendix ___B___. Slightly more than half of the total was used to pay overhead costs associated with the NSF Science Liaison Staff. The remainder was used for procurement of commodities (mostly books) needed to insure the productivity of consultants.

C. Rupee inputs from the NCSE

While information concerning Indian Fiscal Years 67-68 and 68-69 is not available, information for subsequent years is given in Appendix___C___. Perhaps it is through these accounts that the vitality of the NCSE is most apparent. Clearly, the NCSE has successfully played the innovative role which had been envisioned at the outset. The NCSE has provided support for experimental programs which were high in merit but low in conformity to prevailing program categories.

It is interesting to note the active role of the Indian Institutes of Technology in the SEIP. These institutions do not ordinarily come under the UGC for funding. If the NCSE channel to the Ministry of Education had not existed, it would have been difficult to find support for the Indian Institutes of Technology to participate in the project. Thus, the NCSE provided a valuable mechanism through which the expertise concentrated in these institutions could be diffused into the educational systems of India.

The State of Rajasthan received support and encouragement for operating its own program of summer institutes through a grant from the NCSE. Similarly the Community Science Center in Ahmedabad received encouragement. The Bombay Municipal Corporation project in science education was assisted by the NCSE. Other grantees can be identified by consulting the Appendix.

The cost of office space for the NSF staff was met through the NCSE budget.

D. Rupee inputs from the UGC/NCERT

The University Grants Commission has provided the major share of the operating costs of the SEIP. This embraced the summer institutes, the college development activity and a number of the materials development sub-projects. The NCERT regularly reimbursed the UGS and NCSE for the costs associated with the operation of summer institutes for school teachers up to but not including the summer of 1972 when it took over these expenses itself. Detailed information on rupee expenditures by the UGC and NCERT has not been made available at the time this report was prepared.

E. Rupee inputs from the ISTE

The Indian Society for Technical Education (formerly known as the Association of Principals of Technical Institutions) has played a key roll in the planning and implementation of the activities of the SEIP concerned with engineering and technical education.

Information on their contribution to the program is given in Appendix D. At the time this report was written information is unavoidably incomplete.

A further note on the Indian inputs to the SSIP is in order. In the operation of any program in the U.S., provision for overhead costs are universally included in program budgets. In the inventory of fiscal inputs made here, the overhead costs have not been counted. Hence the figures given should be increased by approximately 25% in order to get a more accurate indication of the real inputs.

Perhaps it would be in order to note at this point that throughout the program the National Science Foundation has not charged AID for any of its own overhead costs. The entire operation in Washington (procurement of commodities, recruitment of staff and consultants, the arrangement of training programs of the Participants) was a contribution to the program from the National Science Foundation.

SECTION III -- PROJECT ACTIVITIES

A. Role of the NSF Staff

During the course of the SEIP NSF Staff Scientists have played a variety of roles. Initially there were administrative problems which pre-occupied the staff. It was necessary to establish a working relationship with AID, to organize a local staff, to draft position descriptions, and to recruit U.S. staff. In addition there were administrative problems relating to the NCSE. Quarters suitable for both the NCSE and NSF staffs had to be found. The office had to be provided with furniture and equipment.

Throughout the life of the SEIP Staff Scientists have worked closely with the directors of the authorized sub-projects. This has included:

1) planning aspects;

2) monitoring progress and solving problems when they arose;

3) supplying information on relevant educational developments in the U.S.;

4) providing an information conduit for the Indians.

This last point cannot be given too much emphasis. In India channels of communication are still primitive and there are relatively few opportunities for scientists and educators to

exchange ideas at professional meetings. An important function performed by the NCSE Staff was informing different sub-project directors of similar activities being carried out by others in India. Through these consultations needs for future consultants were established.

Staff scientists have worked directly with the consultants and invited visitors in a variety of ways.

1) Providing them with information about their assignment prior to departure from the U.S.

2) Reception and orientation on arrival in India. In almost all instances a prior site visit had been made by a Staff Scientist.

3) Debriefing and assistance with exit formalities. In every instance the Staff Scientist held a debriefing session with the consultant prior to his departure from India.

As the NCSE became operational Staff Scientists were involved with meetings of the NCSE Council and Panels. During the years in which there were professionals working as officers of the NCSE, there were frequent contacts on all phases of operations. Staff Scientists attended virtually all NCSE meetings on special invitation. As the NCSE assumed a lesser role in coordinating national programs for the improvement of science education in India, Staff Scientists sought closer relations with the other agencies which were entrusted with the implementation of the SEIP.

Following the India-Pakistan war of 1971, there was a period when no consultants were cleared by the Government of India. Even under the most recent operational work plan the number of consultants cleared has been small and often the NSF spent considerable time in dealing with Indians who could expedite the clearance procedures. As project activities slowed down during 1972 and 1973, the Staff Scientists often have played the role of consultants in a number of ways:

1) serving with boards of study of COSIP universities;

2) working with professors on the preparation of new textbooks;

3) consulting with sub-project directors on special workshops and on COSIP activities;

4) participating in regional COSIP meetings or followup meetings to binational conferences.

The Staff Scientists have maintained excellent professional contacts with their counterparts throughout the lifetime of the SEIP. This has been true even during the time of deteriorating political relationships between India and the U.S.

Members of the NSF Science Liaison Staff in New Delhi are listed in Appendix E. For additional details concerning the activities of Staff Scientists it is suggested that End of Tour Reports previously submitted to AID be consulted. It will be convenient to describe the project activities in SEIP in terms of

the canonical categories set forth in the original comprehensive plan recommended by the 1966 planning conference. Viewed from this perspective, the coherence of the SEIP activities is clear. The discussion treats summer institutes, college development, school development, materials development, and special projects/binational conferences.

E. The Summer Institutes

The summer institutes provided leading science teachers in India with an orientation to some of the new science curricula developed in the United States. A list of the U.S. materials used in the summer institutes is given in Appendix F. A brief summary of the number of summer institutes, the number of U.S. consultants, and the changing nature of the summer institutes program is given in Appendix G. The names of U.S. consultants are listed by year in Appendix H and invited travellers in Appendix I.

In the hands of local leaders, the summer institutes have become increasingly useful tools for implementing improvements in the teaching of science. The institutes have been supported by the NCSE, UGC, NCERT, the Indian Society for Technical Education as well as by the States of Andhra, Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, and Municipal Corporations of Delhi and Bombay.

Figure 2 shows the number of institutes by type for each year of the program. The increase between 1971 and 1972 in the number of institutes for school teachers reveals the renewed interest of NCERT in summer institutes. Institutes for college teachers have been maintained at a level already reached by the time STEP was defined. While the institutes for teachers from the polytechnics have suffered a mild setback with the abrupt termination of consultant inputs in 1971, they and the institutes for teachers from the engineering colleges continue to prosper.

Figure 3 shows the rise and fall of the number of summer institute consultants. The trend toward an increase in special consultants was frustrated by the December 1971 war between India and Pakistan. Figures 4 and 5 show the growing emphasis on advanced level institutes since 1967.

Some important developments in the summer institute program in India are enumerated below:

1967 NSF Science Liaison Staff took over management of the summer institutes and for the first time, dates for the summer institutes coincided with the break in the Indian academic year rather than the U.S. academic year.

The institute director had a voice in the allocation of consultants.

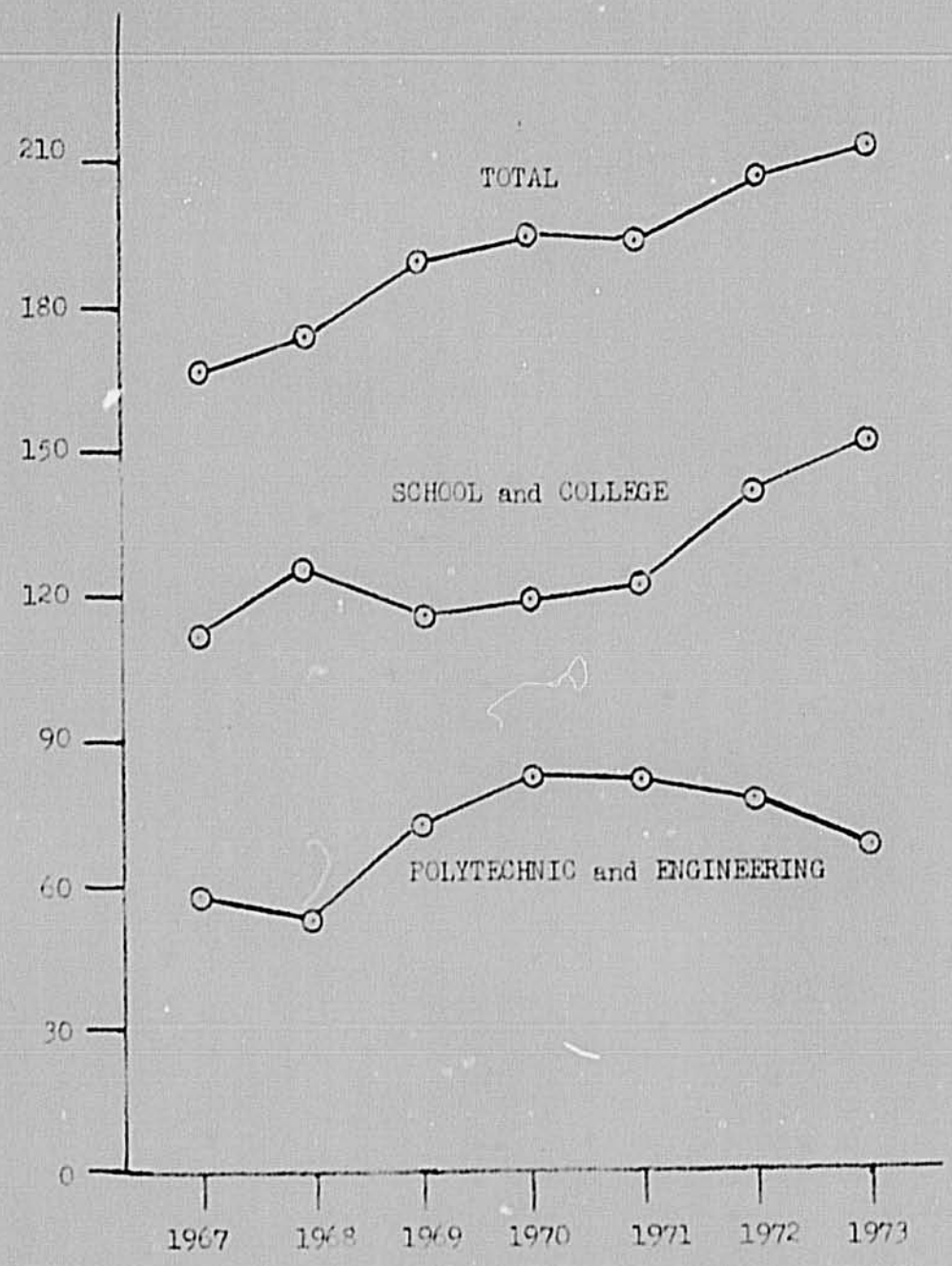


FIGURE 2. NUMBER OF SUMMER INSTITUTES BY TYPE AND YEAR

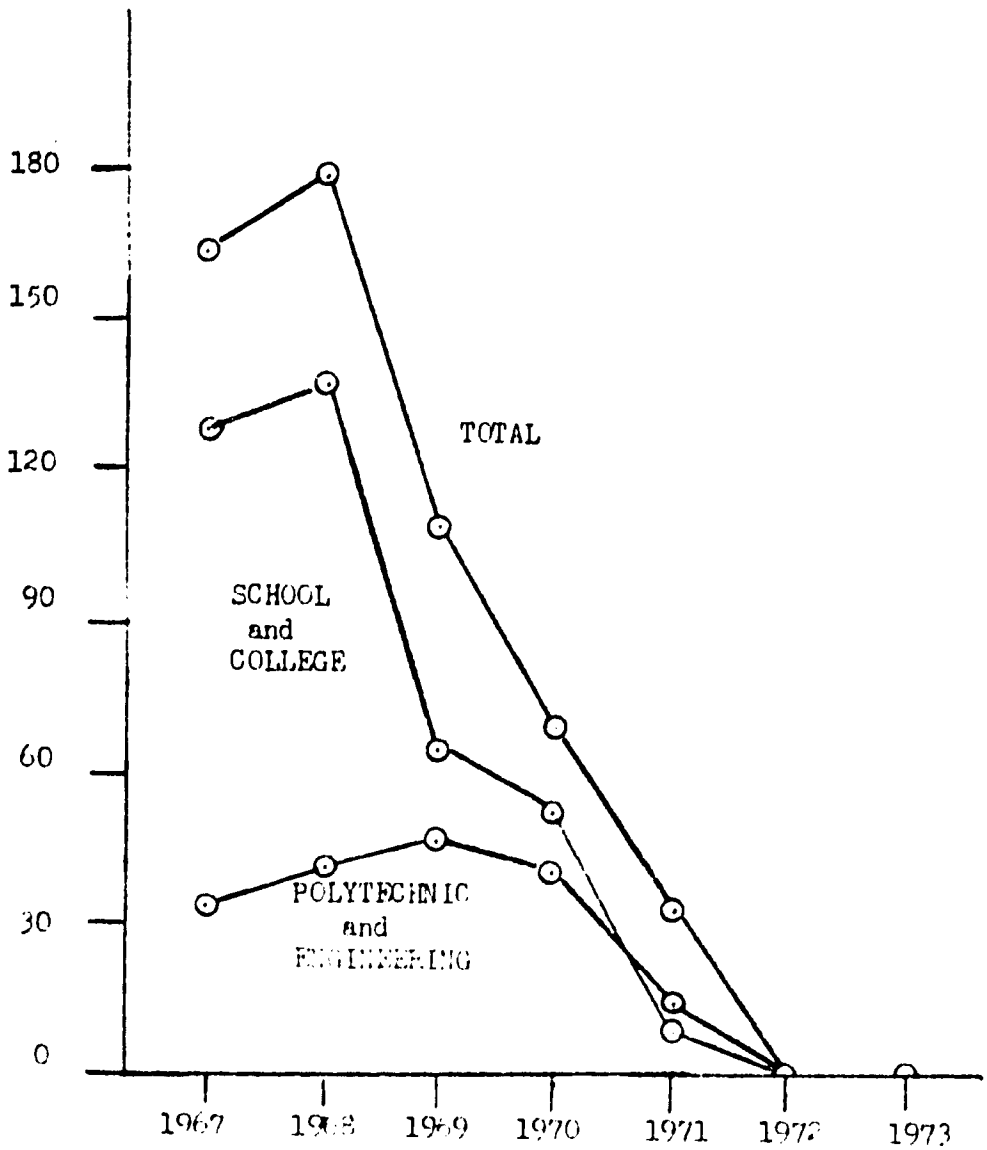
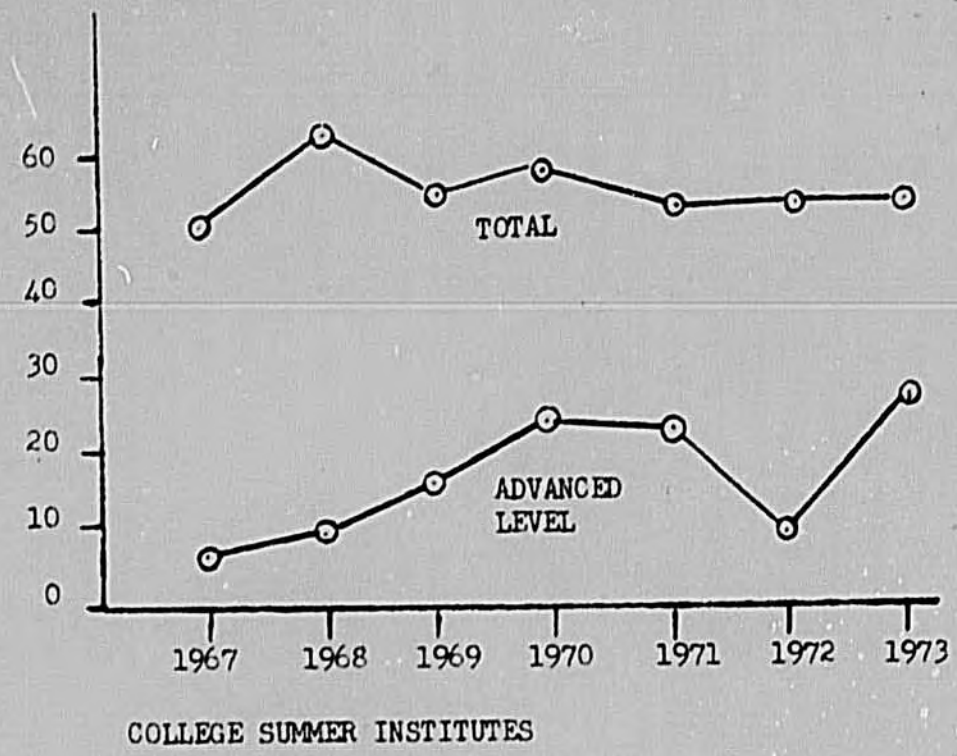


FIGURE 3. THE NUMBER OF CONSULTANTS FOR THE SUMMER INSTITUTES



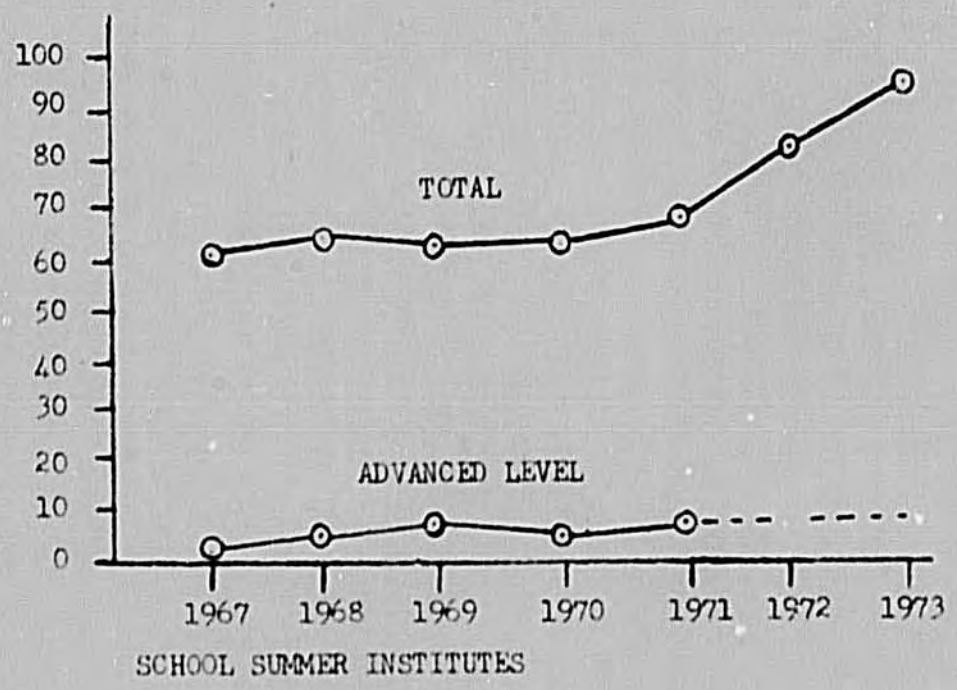
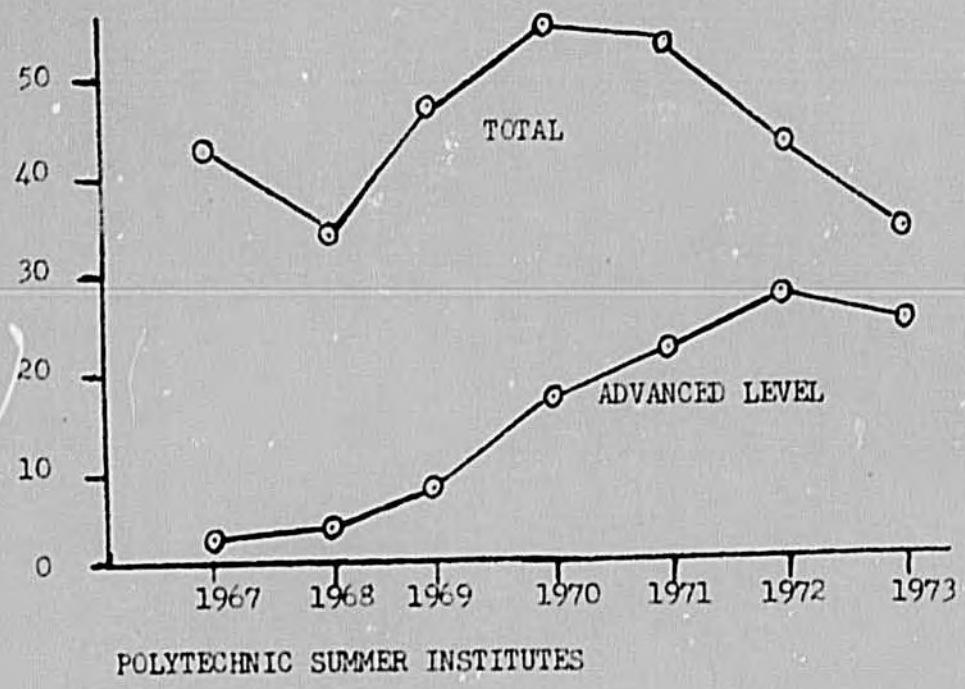


FIGURE 4. THE CHANGING EMPHASIS OF SUMMER INSTITUTES



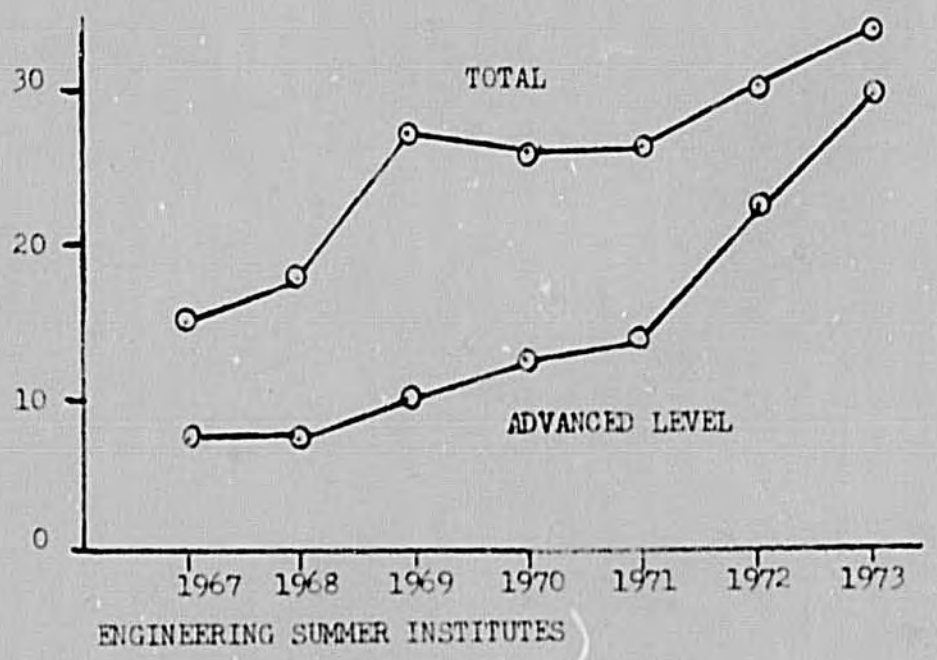


FIGURE 5. THE CHANGING EMPHASIS OF SUMMER INSTITUTES

The brochure announcing college level summer institute programs specified the presentation of specialized subjects giving prospective participants a basis for deciding whether or not to apply for admission.

1968 Proposals were solicited from prospective summer institute directors and reviewed by NCSE advisory panels, thereby insuring local sponsorship by committed leaders.

Consultants were assigned only to directors who were organizing a summer institute for the first time.

The State of Rajasthan initiated its own program of summer institutes patterned after the national program.

Osmania University conducted a college level chemistry summer institute for teachers of its own colleges. This was the first explicit use of the summer institute as a mechanism for teaching teachers who frame and work with a single syllabus and may be regarded as a prototype for the college development effort recommended by the planning conference of June 1965.

1969 Two institutes presented the Project Physics course recently developed at Harvard University.

The Earth Science Curriculum Project material which had not been published in the U.S. was used for the first time as a basis for a summer institute.

Two school level summer institutes were organized for homogeneous groups of teachers as recommended by the planning conference.

Six summer institutes were devoted explicitly to teachers of affiliated colleges, as recommended by the planning conference.

1970 The State of Rajasthan was in the third year of its own summer institutes program with financial support from the NCERT.

The State of Maharashtra had organized SSIs and in-service institutes.
Five school level institutes were organized for homogeneous groups of participants as recommended by the planning conference.

1971 At the direction of AID, support for engineering and polytechnic programs was curtailed.

Assignment of U. S. consultants was limited to summer institutes where special topics were presented.

American Chemical Society Short Courses were presented in India with outstanding reception. One Indian Short Course modeled on these lines was given ~~in Bombay~~ at the Indian Chemical Society meeting

1972 The brochure announcing college level institutes gave a unique description of the program at each institution thereby enabling all applicants for admission an opportunity to approach institutes which were offering courses of special benefit.

The school level institutes were organized and funded by NCERT for the first time. The UNESCO materials, developed at NCERT with assistance of UNESCO consultants, were used in these institutes which catered exclusively to homogeneous groups of teachers.

Short training programs patterned after the summer institutes were offered during the winter holidays, thereby extending the range of the original institute program and adapting it to local conditions.

Through 1971, 16,300 secondary teachers have participated in 412 summer institutes. Through 1972, 14,567 college teachers have participated in 209 summer institutes.

The concept of in-service training of teachers through short courses offered during the summer has been widely adopted in India. Increasing use has been made of summer institutes to implement the teaching of new curricula. At the college/university levels, not only are specialized short courses providing a further enrichment of science curricula but summer institutes have been used to enlist the participation of leaders in the development of new syllabi and curriculum materials.

C. College Development

1. Background

At the heart of the "follow-up" program recommended in the planning conference of June 1966 was the idea of making strategic use of the affiliating relationship of Indian colleges in implementing the use of new curricula. In India the university prescribes the syllabus, sets the external examinations and grants the degree; the college is responsible only for teaching in accordance with the set syllabus and in anticipation of the set examination. There are over 2,000 colleges affiliated to approximately 30 universities.

Following the recommendation of the 1966 planning conference, a few university departments made a pioneering

enture in the systematic use of summer institutes to reach the teachers from its own affiliating colleges. The participants in these summer institutes all followed the same syllabus and had the opportunity to discuss it in detail with the university faculty responsible for that syllabus. From the ferment of these summer institutes, a number of useful ideas were distilled. Conspicuous examples of this type of summer institute were those conducted by the chemistry department of Osmania University, which ultimately gave rise to the university adoption of a revised chemistry curriculum and the writing of new textbooks.

A Binational Conference on Chemical Education and Research was supported as a special project of the DEIP in the summer of 1969. A discussion of the conference and its recommendations will be given later in this section of the report. A leading role in the early experimentation with college development projects already had been taken by the chemists. One of the important recommendations of the chemistry conference elaborated a detailed plan for support of college development activities.

In 1970, the University Grants Commission announced a program for the support of College Science Improvement

Projects (CDCIP) in the format recommended by the NCCC. The essential features of the college development activities discussed in 1966 were included. Two categories of grants were announced. One was designated as University Leadership Projects (ULP). Centered in a single university department, these projects were intended to provide leadership for the affiliated colleges in a comprehensive effort to improve education in that discipline. The other was called the Special College Program (SCP). Centered in a single grantee college, this program was intended to improve the mathematics and science departments in that college. The UCC solicited proposals from various universities and colleges. Those with greatest relevancy and merit were identified through a screening process including both external review and site visits. NSF staff scientists and special consultants participated in discussion of these plans.

During the first year of operation 15 university departments were chosen for support: 12 grants were actually made. Figure 6 shows the locations of these universities. At the same time grants were made to 77 colleges for the SCP. Figure 7 shows the locations of these colleges.

Figure 6

LOCATIONS OF UNIVERSITY LEADERSHIP PROJECTS

● SELECTED IN 1970

⊘ SELECTED IN 1973

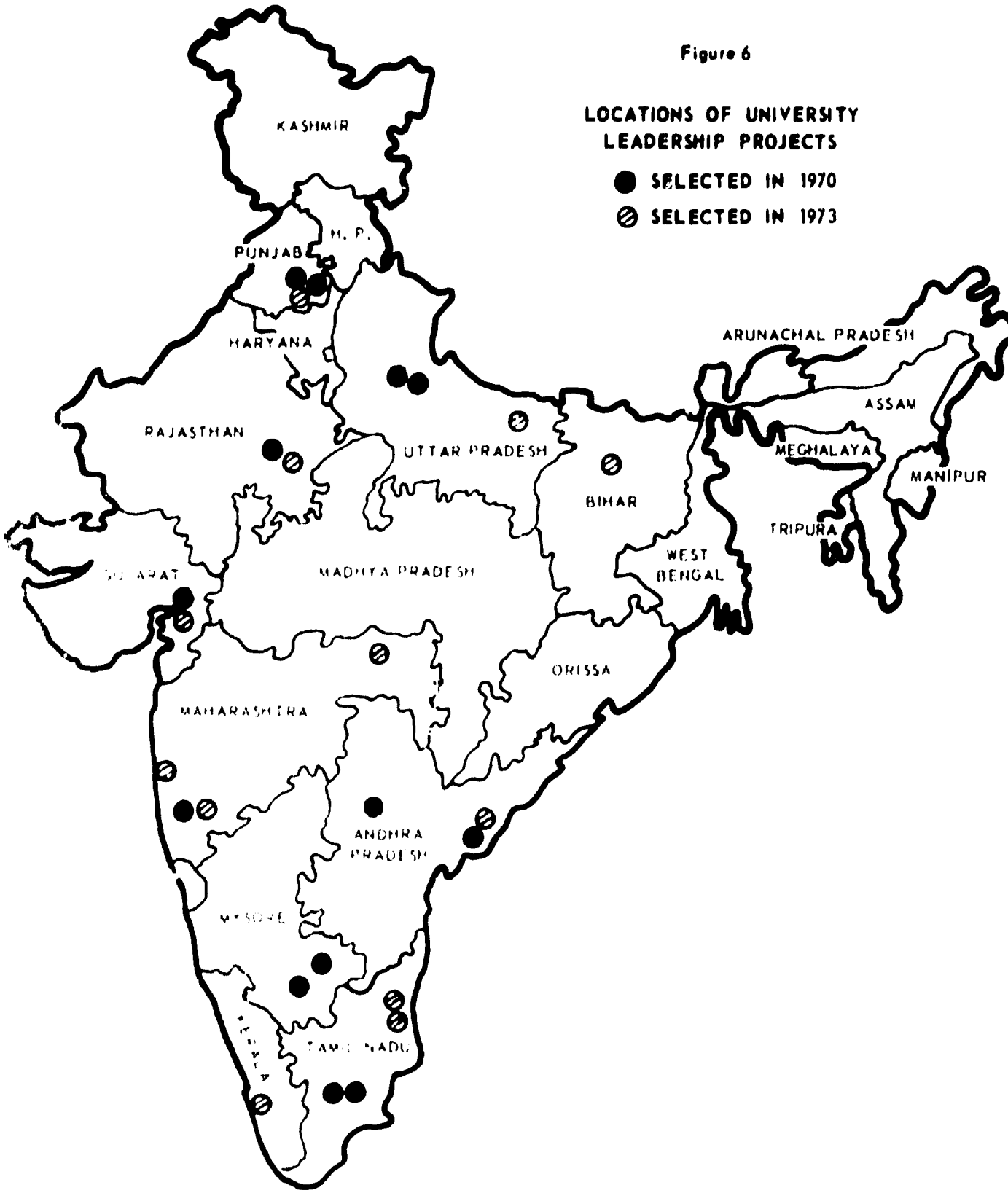
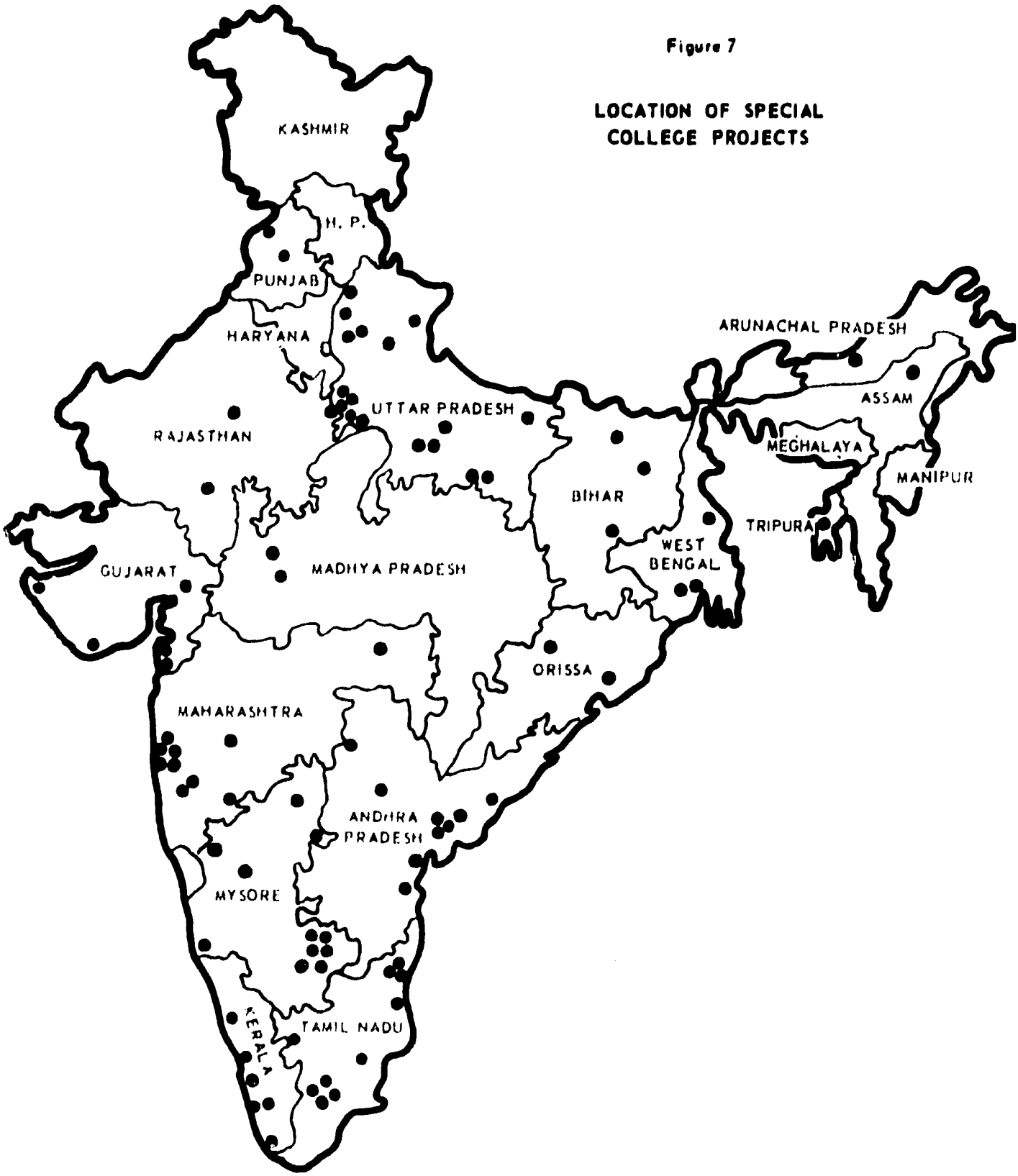


Figure 7

LOCATION OF SPECIAL COLLEGE PROJECTS



2. Selected Colleges Program

The College Development scheme adopted by the UGC includes a Selected Colleges Program under which individual colleges are selected for science education development grants. They have responded by the organization of improved science libraries, laboratory facilities, student projects, and special programs for the professional development of faculty. To assist various colleges in keeping abreast of new developments engendered by COSIP, a general Newsletter has been authorized by the UGC. It is published by Madurai University and distributed to all the COSIP grantees.

NSF Staff Scientists have participated in regional meetings of representatives of colleges participating in this program.

3. The University Leadership Projects

a. Biology

Initially the UGC selected three sites for the ULPs in Biological Sciences. They were -

Botany Department, Madras University

Botany Department, Meerut University

Biological Sciences Department, Madurai University

Both Botany awards were to departments whose Chairmen were close to retirement age. The prospect of changing leadership has inhibited progress at these sites. However, the

Botany Department at Meerut University continues to be active in the summer institute program and under the JLP, inser ice workshops on "Evaluation Methods for Biology Teachers" and "Topics in Modern Biology" have been conducted.

JLP at Madurai has benefited from the dynamic leadership of a young Chairman. During the first three years, primary emphasis has been placed on nine in-service courses covering sub-disciplines of bioscience. These courses are of 4-5 weeks duration and emphasize the experimental and inquiry method. All biology teachers from the affiliating colleges have had the opportunity to participate in at least one of these courses.

Laboratory manuals and charts have been developed for the in-service courses. Working in collaboration with the Universal Biochemical Company, Madurai, the JLP staff has developed appratus and kits for these courses. A detailed listing is given in **Apendix J** of this report, on materials.

Each college, participating through its representative, receives books, chemicals and apparatus necessary to reproduce the course in the college. The affiliated colleges have been organized into four districts within which local meetings are held to sustain interest.

The University of Madurai publishes quarterly a journal called "COLIP News and Views" (Biosciences) which is distributed nationally. The journal keeps the bioscience community informed of JLP progress and solicits suggestions for activities and projects.

The Department of Biological Sciences at Madurai University is a pace-setting department. As a relatively new institution it has been possible to introduce new programs and policies to an unusual degree. Since 1968 the Department of Biological Sciences at Madurai has provided national leadership in Bioscience Education development and reform. It was the first university in India to present an integrated approach to the life sciences. Not only has the department presented a sophisticated series of summer institutes under the auspices of the NCERT and UGC but it has encouraged research participation by college teachers. The Indian adaptation of the BSCS* Yellow Version "Biology, An Inquiry Into Life" was prepared by the staff of this department. Plans have been formulated to adapt the BSCS* Blue Version "Molecules to Man".

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* BSCS: Biological Sciences Curriculum Study. See Appendix F for complete designation of the materials used in the summer institutes.

b. Chemistry

Three chemistry departments were invited in 1970 to participate in University Leadership Projects. These are at Osmania University, Hyderabad; Punjab University, Chandigarh; and Poona University, Poona.

Initially the ULP activities followed quite different approaches at each of the universities, partially because of the political restrictions involved in academic council approvals but also because of local leadership. As the third year of the initial ULP grants draws to a close, each has begun to draw on the experiences of the others and on teaching aids and equipment developed throughout India thereby reducing the duplication of effort which often takes place in India. A brief summary is presented describing each chemistry ULP.

(1) Osmania University, Hyderabad

The basic approach in this ULP entails planning workshops utilizing the staff of Osmania University and affiliated college teachers to develop ideas in five areas.

Textbook preparation

Experiments for the practicals based on the new syllabi and textbooks

Demonstration experiments

Teaching aids including books for the college libraries

Test construction and evaluation

Strong local leadership has resulted in progress in each of these areas. After locally organized planning workshops have made their recommendations, groups have carried through to write textbooks, to prepare laboratory guides, to recommend equipment and book purchases for the colleges, and to develop sample test questions. Subsequently, workshops held during the college vacations are utilized to orient teachers to the new programs. It is clear that the basic approach of the summer institutes has been adapted in the presentation of these workshops. The new textbooks already developed and published include:

General Chemistry (derived from the general chemistry book that came from the summer institutes)

Organic Chemistry

Problem book for physical chemistry.

Titles of several books soon to be published are:

Physical Chemistry

Quantum Mechanics for Chemists

Inorganic Chemistry

A variety of improved molecular models have been supplied to each college for use in lecture demonstrations; charts have been developed with a private company, Bio-Visual Production, Hyderabad; a basic booklist has been made available to each college library; equipment required to teach

topics prescribed in the syllabi have been furnished to each college.

A newsletter on the chemistry JLPs is published regularly at Osmania University and circulated nationally.

( ) Panjab University, Chandigarh

The experiences in trying to train teachers through summer institutes convinced the staff of the Chemistry Department at Panjab University that the most important first step was academic council approval of syllabi, followed by workshops based on the new syllabi. Consequently the JLP patterns at this University has some noticeable differences from that at Osmania and Poona Universities. It consists of these stages:

> Discussions of university and college teachers lead to outline for new syllabi.
>
> Submission of the new syllabi to the academic councils for approval.
>
> Development of "blowups" for each syllabus, teachers' guides, experiments for the practicals and sample problems, and test questions.
>
> Workshops based on the "blowups". In addition 2-3 day meetings in each district have been held with university staff.

The reception of the new approach has been outstanding, with four other universities in the Punjab, Haryana and Himachal Pradesh, including all of their affiliated colleges,

voting to adopt the JUP materials in their chemistry departments. Teacher and student response at the end of the first year was very favorable. Less emphasis has been placed on equipment and books during the first year but there will be more need in these categories in the second and third year courses. University faculty regularly visit the colleges to present lectures and to discuss any difficulties the teachers may have.

The "blowup" is an expansion of the syllabus for each course, meant primarily for teachers and not as textbooks for students. The teachers' Guide amplifies the blowup with detailed discussion of topics, outline and suggestions for the practicals, and sample problems and test questions. The first year course is a general chemistry presentation, with clear derivation from CHEM* materials and represents a marked departure from the previous first year course. "Blowups" for the second year have been completed and will be printed in the summer of 1973.

(3) Poona University

Because of academic unrest on the local campus, the start of the JUP at Poona University was delayed for almost a year. The primary step was the framing of a new syllabus by the university department and its acceptance by the academic

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* CHEM - Chemical Education Material Study. See Appendix F for complete designation of the materials which were used in the early summer institutes.

council. No textbooks or teachers' guides have been prepared. Instead, a major effort has been placed on development of laboratory manuals, demonstration manuals, and the equipment needed by the colleges to introduce the new syllabus. Summer workshops modelled after the summer institutes are devoted to specified topics. An innovative workshop scheduled in May 1973, for demonstrators from the colleges, is the first such effort to train people in this category. It is most appropriate because of the emphasis the Poona JLP has placed on equipment for both lecture and the laboratory use. In India the demonstrator has responsibility for this equipment.

The Poona JLP has taken advantage of charts developed at Osmania and Panjab Universities, molecular models at Andhra University and instruments designed through the biology JLP of Madurai University.

c. Mathematics

There are five JLPs in mathematics. These are located at these universities:

Bangalore University, Bangalore

Gujarat University, Ahmedabad

Madurai University, Madurai

Meerut University, Meerut

Panjab University, Chandigarh

The nature of the JLT activities at each centers is distinctive and reflects the fact that the number of affiliated colleges associated with the universities ranges from 15 to as many as 115. The staff at each university is generally well trained. They have identified the major problems that must be faced in improving mathematics education in India and the need for J.C. inputs to University Leadership Projects is small. The exchange of ideas between these universities has been slow. While requests for meetings to accomplish this have not been approved as yet by the University Grants Commission, it is anticipated that the 1973 binational conference on mathematics education will alleviate this problem.

(1) Bangalore University

There are 15 affiliated colleges participating in the mathematics ULP of Bangalore University. The development areas center in three areas: curriculum revision; textbooks and other teaching materials; and examination reform. Committees of college and university teachers have been organized to develop guidelines in each area and to prepare programs for trial use in the colleges.

In addition the University Department holds refresher courses throughout the year for retraining the college teachers in new topics introduced in the revised curriculum.

(2) Gujarat University

The ILP is based on a five year plan to modernize the Mathematics Syllabus at the undergraduate level and to upgrade the teaching of mathematics in all 15 affiliated colleges. There are three components in the program.

a. Revision of syllabus and preparation of suitable textbooks;

b. Strengthening library facilities in the colleges;

c. Training teachers. Fifteen teachers from fifteen different colleges spend a full year in intensive study at Gujarat University. This training program is spread over a three year period (five teachers trained each year) and it is expected that these teachers will take up leadership positions at their colleges.

(3) Madurai University

The primary emphasis under the ILP is a training program in which three teachers from each of ten affiliated colleges spend an academic year at the university. At the end of the three year period, the teachers at 30 affiliated colleges will each have three staff members who have completed the training program.

Emphasis is also placed on changing the nature of the examinations. There is considerable interest in changing the examination system with autonomy being granted to some colleges who would serve as examples of the benefits that result from autonomy.

(4) Meerut University

This UMP has prospered under leadership which has played a particularly important role in framing the new mathematics syllabi of the Central Board of Secondary Education. Consequently, particular attention has been given to the secondary school/undergraduate interface. The coordinator of the project is also the vice-chancellor which has helped to give the project an unusual impetus. New materials of every category are under preparation and experimental use.

(5) Punjab University, Chandigarh

There are 115 colleges affiliated to Punjab University in the States of the Punjab, Haryana and Himachal Pradesh. As a consequence, the UMP activities effect a large number of teachers and students.

Major effort has been placed on syllabus revision and writing textbooks. This has been achieved with committees under the chairmanship of university staff with college teachers directly involved. Texts on geometry, algebra and calculus have been prepared and printed. Summer training sessions are held each year to train mathematics teachers to use these new books. Simultaneously these teachers are oriented to the changes being introduced in the examinations.

3. Physics

There are three ULP centers for physics. These are located at Andhra, Mysore and Rajasthan Universities.

(1) Andhra University

Andhra University had the first University Leadership Program in Physics and as a consequence its program has made the most progress in four different categories -

revision of syllabus

change of examinations

retraining of teachers and

development of laboratory equipment.

The new syllabus primarily involves the introduction of new topics and was approved by the University Board of Studies. It was recognized that the most effective way of implementing the new syllabus was by updating the examinations and consequently the ULP staff prepared about 300 model questions of an improved variety. These were sent to all the physics teachers in the colleges with the notification that 60% of the examination at the end of the year would consist of this new type of question.

Implementation of the new syllabus and examination required training programs for the teachers. Each year Andhra University has conducted three institutes of four week

duration so that at least one teacher from each college could receive additional training. These institutes included discussions of the syllabus, model examination questions, laboratory work and shop work.

Some equipment has been made by college teachers during these institutes; some has been purchased for distribution to the colleges. The UGC has agreed to support a program of scientific equipment construction based in the Physics Department. There will be a research wing and a development wing with a target of 50 instruments of a particular kind to be sent to the colleges.

A CDSIP Newsletter is published regularly as a means of communicating with the affiliated colleges.

(2) Mysore University

The JLP at this university has followed a different strategy. Initially the syllabus was revised by means of a careful consideration of the consecutive development of topics and a coherent approach to physics. Since this new approach does not follow any available text, the university staff has undertaken writing new text materials for the three years course. There has been some revision of examination questions in order to follow the new syllabus.

Short courses are presented during the summer vacation and the University has attempted to bring all the college physics teachers to the university campus at least once each year.

PSSC* equipment, originally imported for use in the early SSIs but now made in India by Dynam Corporation, and some equipment of indigenous design have been supplied to each college. Teachers are being trained in the use and maintenance of this equipment.

(3) Rajasthan University

The UIP at this university was initiated in 1971-72. The major emphasis centers on development of new physics equipment for demonstration and for the laboratory.

D. School Development

1. Bombay Project

The Municipal Corporation of Greater Bombay, executing statutory responsibility for education through its Department of Education, manages a system including 1600 schools, 17,000 teachers, and 650,000 pupils. Instruction is provided in ten Indian languages and in English. As a composite of the diverse peoples and cultural influences in Indian education, Bombay is an optimum site for pilot work

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* PSSC = Physical Science Study Committee. See Appendix F for complete designation of the materials used in the summer institutes.

in elementary science and education. Excellent local leadership has been a key factor in making significant progress in the development of new science and math curricula, in reorienting local teachers and in the introduction of the new curricula in pilot schools.

Efforts to improve the teaching of elementary science in the Bombay schools predate the formalization of an SEIP subproject. Workshops were conducted as early as 1963. In 1965, 50 teachers assembled to prepare their own teaching aids. In 1966 a Fulbright Scholar worked 5 months with municipal teachers in devising inexpensive science teaching apparatus. Late in 1966 this scholar sought unsuccessfully to enlist AID/ED interest in assisting Bombay in a systematic way.

In 1967 the Municipal Corporation of Greater Bombay submitted two proposals to the NCSE. Both were commended and referred to NCERT. In the absence of uncommitted funds NCERT referred the proposal back to NCSE with the suggestion that NCSE provide funds and in February 1968 the NCSE Council accepted the NCERT suggestion. At the same meeting NSF was asked to assess what support could be made available under the SEIP. Following an AID freeze on recruitment of SEIP personnel NSF consultant services started in March 1969.

During the remainder of the year the project was provided 17 weeks of consultant services in addition to a number of NSF consultations.

At the outset of the project, it was evident that development of talent was needed along several lines simultaneously. Since the local staff lacked experience or training in science, in writing, in visual aids and in curriculum development, the first workshops assisted in identifying key staff members who would serve in leadership roles in later work.

The Education Officer in charge of elementary schools in Bombay visited the U.S. as a Participant observer in 1970 and was provided with the materials from all the U.S. elementary curriculum development projects. She, along with her select committee, decided that the Process Approach of AAAS provided the maximum flexibility in contrast to the existing syllabus.

In 1970 NSF provided six consultants to the project. In 1971 NSF provided five consultants and a full time staff Scientist (Elementary) to the project.

Prior to the arrival of the Staff Scientist, two officers of the education department and two artists had become [illegible] permanently assigned to the Teaching Aids Center where the

curriculum development work was being done. Drawing on the materials and experiences from earlier workshops the team of consultants and staff completed the teachers guides for Standards I-IV. Thirteen science booklets for students were printed for use in Standard I-II.

With the arrival of the Staff Scientist it was possible to coordinate several lines of concurrent work and to accelerate the rate new materials were generated.

1. Teachers Guides I-II were field tested, revised and republished.

2. Teachers Guides III-IV were field tested in draft, revised and published.

3. Development of Science Demonstration Kits for Standards I-II was completed. 350 were produced in the Teaching Aids Workshop, entirely of indigenous materials.

4. Demonstration Kits for Standards III-IV were developed in prototype.

5. Translation into Hindi, Marathi, Gujarati and Urdu for all materials was completed.

As the new material became available from the project, workshops were organized to orient teachers to the new strategies in the schools.

1. Other School Development Activities

a. Physics Resource Handbook - The Kyoto Subproject

Summer institutes in physics at the University of Kyoto and the Regional College of Education Kyoto, led to interest

in a writing project that would provide a teachers' resource book for secondary level physics. A long term NSF consultant was recruited to assist in this project. Starting in 1970 a series of workshops were inaugurated with the twofold purpose of developing the handbook and of evaluating the materials produced. The Physics and Science Education Departments at the Regional College took the responsibility for these two phases of the project.

The first volume of the proposed three volumes of the handbook was completed and published by May 1972. An evaluation workshop was held in June 1972 to train the teachers who would use the handbook in their schools during 1972-73. Pre-tests, chapter tests and final tests were prepared for the evaluation study.

Following the completion of the NSF consultant's tour of duty there was a period of approximately six months (June to December 1972) where the question of NSF AID support remained unresolved. This question was resolved in the affirmative when NCERT requested AID support. Financial assistance through December 1973 has been approved. The second two volumes of Physics Resource Materials should be completed by the Physics Department and the evaluation program by the Science Education Department carried out by that time.

The interest in this project can be recognized by two facts. The Regional College of Education Mysore continued to move ahead even during the period when AID support was being reviewed. The Chemistry Department of the College has initiated an analogous program. The goal is to write a resource book for chemistry teachers without any outside assistance. This project is being carried out with the financial assistance of NCERT, the agency under which the Regional Colleges of Education operate.

b. Board of Secondary Education, Rajasthan (Ajmer)

In February 1973, the Board of Secondary Education in the State of Rajasthan transmitted to the NCF office a document that summarized the educational programs and activities undertaken by the Board since 1966. Although NCF has not participated directly in any of these programs initiated by the Board of Secondary Education in Rajasthan, there have been many occasions when the NCF Staff has had opportunities to meet members of the Board and be informed of their activities and to make occasional site visits in the state. The State of Rajasthan has established its own summer institutes since 1968. In 1970, 1971, and 1972, these institutes have been based on the new syllabi in collaboration with NCERT and NCERT. Extensive use has been made of films borrowed from NCF.

The new science curriculum in science subjects was introduced in all schools in Rajasthan in 1970. The first examination based on the curriculum was conducted by the Board in 1971 and the higher secondary examination will be instituted in 1972. Some aspects of the program's curriculum in Rajasthan are listed here. (The statistical data is taken directly from the report of the Board.)

Types of Institutes and Programs	Teachers trained
Training Paper Setters	[illegible]
Orientation of teachers for new concepts of evaluation	
Elementary mathematics	63%
Physics	[illegible]
Chemistry	[illegible]
Biology	[illegible]
Vocational	[illegible]
Examiners for practical examinations	
Higher secondary science	[illegible]
Secondary science	[illegible]
Summer science institutes (%)	
Academical teachers	[illegible]
Senior teachers	[illegible]

In addition to these training activities, The Board has established units which concentrate on:

- preparation of instructional materials
- follow-up work to the summer institutes
- revision of the curriculum
- organization of refresher courses
- supervision of examinations, including internal assessment.

In summary, the State of Rajasthan has pursued a vigorous program of educational reform since 1964. Summer institutes were introduced in 1965 and constitute a major device for orienting and training secondary teachers in these changes.

c. Delhi Directorate

There has been an active program of science curriculum revision in the Delhi Directorate which supervises the elementary and secondary schools in the Federal Territory, Delhi, and in the Central Schools throughout India.

The mathematics teachers from Delhi University who were responsible for the organization of the first summer institutes in 1965 were responsive to the complaints of summer institute participants concerning the difficulty of [illegible] introducing new content into the teaching of mathematics without a corresponding change in the [illegible] [illegible] and examination. They addressed this problem by electing

the involvement of the Central Board of Secondary Education which prescribes the syllabus and sets the examination for all schools in the Union Territory of Delhi and for the Central Schools throughout India. With encouragement from NCERT a proposal for support of a program for the retraining of TGTs teachers in a series of inservice programs was submitted to the NCERT in 1967. The NCERT endorsed the proposal and was effective in getting the UGC to release the needed funds. In two and one half years the teachers were prepared for the new syllabus. This work is now being taken over by the Delhi Directorate of Education and has become a regular program. In 1970 a workshop was organized for the purpose of reviewing and evaluating the new curriculum in mathematics and for framing recommendations for additional changes. NCERT staff and consultants have been associated with workshops, particularly in mathematics, held at Rampur College for teachers in the Delhi school system. (There has been a close working relationship between the mathematics department of Rampur College and Director [illegible] of Delhi, one of the NCERT mathematics centers.) Staff members have been [illegible] in the [illegible] inservice training programs for Delhi science teachers.

E. Materials Development

Under the aegis of the JCEP, new teaching materials in many categories have been produced. For the purpose of this report they are divided into two categories, publications and other teaching aids, and listed in Appendix J. The publications used in teaching at the elementary level have come out in Hindi, Gujarati, Marathi, and Urdu as well as English. Several others have parallel texts in two languages. Teachers Guides and other resource material are conspicuous on the list.

An activity which deserves special mention is the development of an indigenously designed and manufactured super-8 cartridge motion picture projector. The single concept short film is particularly well adapted for use in India. This format of motion picture avoids the problem of local languages and minimizes the problem of cost of filmed materials. A trial lot of 50 projectors were manufactured. They have been used in experimental programs organized by the Regional Technical Teachers Training Institute, Ajmer and have been made available for use in the Polytechnics throughout Tamil Nadu. Unfortunately, the gift of a large number of film cartridges produced by another educational technology agency was not

accepted by the Government of India and the large scale experimental manufacture of projectors now must await the development of indigenous sources of film programs.

Priority has been given to items of wider potential interest and low unit cost. Polystyrene spheres for use as molecular models are now manufactured in India. The equipment this developed in connection with new programs for teaching physics in the U.S. are now available at cost from an Indian manufacturer. A low cost sample microscope has been produced and made available throughout the NCERT.

More expensive items which are of strategic interest in the overall educational development effort of India were also supported. An example is the manufacture of cathode-ray oscillograph tubes. In this connection an engineer from the Hewlett-Packard Corporation came to India to help organize a technical production run of cathode ray oscilloscope tubes. This item is an indispensible component of an oscilloscope which is a critical item in any physics teaching laboratory. As well it is already related to the ordinary television tube which is now a popular item of use as India expands educational programs via television.

Among the various highlights which can be cited in the area of materials development is the program for entrepreneurial training. This sub-project had as its objective the retraining of unemployed engineers so that they might start small engineering enterprises. After a few experimental summer courses with an MIT consultant, the scope for entrepreneurial training was assessed by faculties of the engineering colleges. On the basis of their recommendations and with the encouragement of key persons in the Ministry of Education, a course has been organized at the Indian Institute of Technology in Delhi. An MIT consultant assisted with the first two cycles of this course. This pioneering effort was frustrated by the lack of consultant inputs that resulted when AID withdrew support for engineering and polytechnic education. The general scheme has been effectively adopted as a strategy for reducing unemployment among the technically educated.

F. Special Projects/Educational Conferences

The provision in the 1961 planning conference for the support of special projects was predicated on the assumption that the PTEP, if successful, would engender efforts by and institutions further upgraded into the critical inputs. It is an possible to provide the order in which and extent of school

districts will be able to unshackle themselves from tradition. Thus for the project to flourish, a built-in capacity to respond to breakthroughs as and when they occurred was needed.

In practice the Indian directors of various sub-projects made considerable progress subsequent to the original planning conference. However, as plans were renewed by the NCSE panels the need for program review, at an appropriately high professional level, was recognized. The idea of bringing a panel of experts in a given interdisciplinary area to India under NSF gained ground. In effect, the category of special projects became translated into biennial conferences.

In 1968 the NCSE Chemistry Panel proposed that a biennial conference on chemical education be held in India. The success of the chemistry conference (1969) led quite naturally to conferences for physics (1970), the life sciences (1971) and mathematics (originally scheduled for 1972 to be held June 1973). At the instruction of AID the conference on mathematics education was specifically noted as the last conference to be sponsored under NSF.

1. Chemistry Conference, 1969

The Conference on Chemical Education and Research sponsored as a special project of the UGC was held at Srinagar and Bangalore June-July 1969. The participants at this conference are listed in Appendix C. This conference provided an opportunity to review the overall philosophy of the 1966 planning conference and to articulate the guidelines developed at that time.

A series of actions were recommended to increase the vigour of chemistry and chemical education in India. The overriding appeal issued by the conference was for the development of flexibility in the educational system in India particularly through the college development program. The hope for India to accelerate its rate of growth and its rate of development seems to rest in the willingness of its administrators to allow some institutions to carry out educational experiments and for its teachers to pursue with imagination and energy the difficult task of raising students as independent and innovative thinkers. The detailed recommendations issued by the conference have been published by the UGC in the report "Chemistry : Design for Innovation".

The conference reviewed the study and teaching in Chemistry and made important recommendations for improvement of teaching

and research, for development of new areas of specialization, for indigenous production of equipment, and for preparation of textbooks, monographs, and a journal devoted to chemical education.

During the period since the conference, a large number of the recommendations have been implemented. The most important recommendation, that for college development, was acted on by the UGC in 1970 in a two-fold program called the College Science Improvement Project (COSIP) which has been discussed in section III-E of this report. Many of the specific recommendations have been carried out through COSIP. It should be recognized that not only chemistry but also physics, biology and mathematics departments have participated in COSIP.

The Indian Journal of Chemical Education has been published since February 1970. A number of special institutes on test construction and evaluation, electronics for chemists, and instrumental methods have been held during 1970-71. Four American Chemical Society Short Courses were presented during 1970-71 at approximately 15 universities. An Indian counterpart was presented at the Indian Chemical Society meeting in Bombay, 1971.

7. Physics Conference, 1970

The Conference on Physics Education and Research met in Srinagar in June 1970. The participants in this conference are given in Appendix I. The Conference provided a unique opportunity for Indian physicists from universities, national laboratories, and research institutes to exchange ideas not only with their foreign colleagues, but also with one another. During the meeting, the delegates participated in discussions which reviewed the state of physics in India, recommended specific steps for the improvement of physics teaching and research, and suggested areas of specialization with reference to national needs and potentials.

The conference recognized the desirability of administratively decoupling Indian colleges and universities from the present monolithic, centralized system, and thus of encouraging local initiative. At the same time stronger links must be established between individual teachers and physics departments on the one hand, and other colleges and university sciences departments, and local industries on the other.

The report "Physics in India: Challenge and Opportunities" published by the NCC, enumerates the conference recommendations. As is true in chemistry, many of these

recommendations have been implemented through CSIR. The Indian Physics Association has been organized. It publishes a bulletin for physics teachers on a regular basis and sponsors the "Indian Journal of Physics Education" which was initiated in September 1971.

3. Life Sciences Conference, 1971

The Conference on Education and Research in Life Sciences was held in Bangalore in June 1971. The participants at this conference are listed in Appendix D.

The Conference served as a forum for discussing the current status of teaching and research in life sciences and for sharing experiences and information between the Indian and U.S. biologists. Some of the specific problems discussed were: the need for making comparative evaluation/frame work for between different disciplines of life sciences; an integrated approach to the teaching of biology at the undergraduate level, and suggestions for developing specialized courses relevant to the country's growing needs; the importance of offering a generalized B.Sc. degree. The discussions recommended are expected to enable the student to attain a wider understanding of biology. At the undergraduate level it was generally felt that the curriculum needed simplification rather than a revision to reflect the growing and antidiscipline study of biology. Courses

should be studied which are designed to contribute evidence to the integration theory and analysis.

The Conference also emphasized the need for the problems of [illegible] and maintenance of family [illegible], as well as the pursuit of research in frontier areas of knowledge.

Considerable thought was given to the question of sharing ideas by [illegible] between a number of [illegible] in a cooperative team.

The recommendations of the conference appear in the report "Biological Sciences and National Development: A Strategy for Progress," published by the [illegible].

[illegible] all the ideas could not be accommodated at the [illegible] conference and a [illegible] was [illegible] to discuss the [illegible] of recommendations at a lower level, the [illegible] sponsored four Regional Conferences on Education and Research in Life Sciences. These were held at:

[illegible], Nairobi, Kenya, December [illegible], [illegible] participants

[illegible], Cairo, Egypt, [illegible], December [illegible] [illegible] participants

[illegible], Delhi, India, December [illegible], [illegible] participants

[illegible], Caracas, Venezuela, February [illegible], [illegible] participants

In addition, two other sponsored conferences will be conducted primarily the subject of [illegible]:

[illegible] Symposium of Proceedings, Poland, March [illegible] (6 participants)

Indian Science Congress, Chandigarh, January [illegible] (1000 participants)

CNSF has [illegible] as an [illegible] to be an appropriate, flexible mechanism by which the conference environment could be useful point in the [illegible] of international [illegible].

[illegible] to the Regional Conferences [illegible] and [illegible] have been [illegible] to [illegible] of [illegible]. These [illegible], [illegible], [illegible], and [illegible]. [illegible] and [illegible] [illegible] have [illegible] as [illegible] [illegible] of [illegible]. [illegible] University with [illegible] from the [illegible], has [illegible] a [illegible] of [illegible].

F. [illegible] Conferences, [illegible]

Tentatively scheduled for [illegible], this conference will be held in June [illegible] in [illegible]. Like the other conferences, this [illegible] primarily by the [illegible] and [illegible] as a [illegible] of the [illegible].

The delegates to the conference are listed in Appendix 7. Pre-conference papers have been prepared and it is expected that conference recommendations will be published by the IFC. A series of regional conferences is planned for the purpose of promulgating the Jamaican achievement.

[illegible]

There are several difficulties in, rather as a hampering in [illegible] as a education of the Indians. [illegible] Project. The original guidance is shaped in the [illegible] planning conference by a [illegible] from [illegible] to [illegible], thereby changing the components of the project. [illegible] people in a [illegible] the [illegible] staff [illegible] the [illegible] of the project as a [illegible] of a [illegible] of these people in a [illegible] responsibility of [illegible] the [illegible] report.

The arbitrary [illegible] has been [illegible] and one of the reports on the planning [illegible] the Pecos Longhorn [illegible]. Bulletin on November 15, 1976, this [illegible] the period January 1, 1976 through December 31, 1976. This report will [illegible] as particular those [illegible] of the Pecos Longhorn [illegible] which

"[illegible] experience [illegible] of people"

"[illegible] of [illegible]"

A. [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] of the program were that the [illegible] would be a properly [illegible] and [illegible] agency for [illegible] and [illegible] [illegible] [illegible]

[illegible] is given in Appendix C. The MCUT sponsors a number of educational journals, including the Indian Journal of Technology (Delhi), the Indian Journal of Chemical Sciences published in Indian Institute of Technology Kanpur, the Indian Journal of Chemical Sciences published in Indian Institute of Technology Delhi, the Indian Journal of Physics published in Calcutta, the Journal of Technical Education published by the Indian Institute of Technology, Kharagpur.

Throughout the life-span of the CTE, the Technical Teacher's Conventions have stimulated a number of new programs initiated either directly or indirectly from activities supported by the MCUT. These include an informal program of summer institutes for college teachers, a program for support for individual workshops, and a [illegible] among the College Teachers to pursue an Program through which individually sponsored [illegible] are given assistance in obtaining grants, a program for the support of visiting of some eminent authors. These programs have program [illegible], professional support [illegible] and [illegible]. They are fully [illegible].

In 1972 the MCUT [illegible] a [illegible] of the [illegible] for [illegible] teachers which [illegible] [illegible] [illegible]. It is [illegible] to note that MCUT [illegible] in the [illegible] which provides a [illegible] for [illegible] one of the [illegible] of

[illegible] have [illegible] as the [illegible] conferences are [illegible] [illegible] and [illegible] by the [illegible]. These [illegible] in the support of the [illegible] program of [illegible] [illegible] for [illegible] the [illegible] [illegible] of [illegible] in [illegible].

For a number of years the [illegible] funds for Engineering and Polymerization [illegible] [illegible] by the [illegible] [illegible] [illegible] for facilities [illegible] the engineering and polymerization [illegible]. The Battelle Institute for Technical [illegible] [illegible] to support these programs.

Staff legislation for the [illegible] of the [illegible] [illegible] [illegible] of Fuchsian and [illegible] [illegible]. [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible].

The [illegible] [illegible], it appears that the [illegible] [illegible] [illegible]. The Chief Counsel's of the [illegible] who had been [illegible] to the [illegible] by the [illegible] have been [illegible]. The Deputy Chief Counsel's who had been [illegible] by the [illegible] have been [illegible]. The Chiefs [illegible] of the [illegible] have [illegible]. The [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]. The [illegible] [illegible], the [illegible] [illegible] have [illegible] the [illegible] of [illegible] [illegible] [illegible] of the [illegible] [illegible] of the [illegible] of [illegible] [illegible] [illegible] [illegible] [illegible] for the [illegible]

Summary of Conditions #1 & 2 Imposed at End of Project

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	No	Yes	Yes
[illegible]	Yes	Yes	Yes
[illegible]	No	Yes	Yes
[illegible]	No	Yes	Yes
[illegible]	Yes	Yes	Yes
[illegible]	No	Yes	Yes

[illegible]

The [illegible] conditions imposed at the end of the project were that there would be [illegible] Low-income Housing Projects in operation and [illegible] of vacant or [illegible] housing units in [illegible] Projects, [illegible] characteristics and [illegible] units. In exchange [illegible] of this report the operation of the [illegible] Income Housing [illegible] Projects [illegible] Low-income Housing Projects have been [illegible] there project [illegible] [illegible] Brown. The Low-income Housing Service Corporation [illegible] Low-income housing [illegible] will be [illegible] the [illegible] project [illegible] the [illegible] price. Thus the projects which have [illegible] such a strong [illegible] will be [illegible] [illegible] additional expensive [illegible] are to be [illegible] [illegible] [illegible] projects.

The Project [illegible] Low-income [illegible] are [illegible] as the [illegible] conditions imposed at the end of the project. [illegible] there [illegible]

[illegible] teacher secondary teachers and selected elementary/secondary programs sponsored by PCC [illegible] in the areas of Japanese, Japanese, [illegible] literature and the General Teachers' Certification in New [illegible] by [illegible].

The following chart gives the number of summer teachers supported during [illegible] by various agencies in the target areas.

[illegible] Summer Sponsorships [illegible]

Sponsoring Agency	Japanese	Literature	Japan	India	Total All Programs
PCC [illegible]					
1. Intensive [illegible] Program Technology	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Institute of [illegible] pre-[illegible] colleges	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3. Fulbright Hayes Teacher Scholars	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NDEA					
1. College	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Mid-Career Fellows Level	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]					
1. Undergraduate	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Postgraduate	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Totals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

2. [illegible]

STAFF

[illegible] - 1) Prog. Coordinator (1); [illegible] (1)

[illegible] - 1) CCEP Administrator (1); CCEP Supv. (1)

[illegible] - 1) Prog. Coord. (1); [illegible] (1)

[illegible] - 1) Elementary Curriculum Specialists

[illegible] - 1) Elementary/Secondary Curriculum Specialists

[illegible] - 1) Elementary/Secondary Textbook Writers

[illegible] - 1) Elementary/Secondary Curriculum Specialists

[illegible] - Pawtucket Redevelopment Corporation
[illegible] - [illegible] College of Education
[illegible] - Central Schools Commission

The Project Logical Framework specifies that [illegible] Project Implementation Teams/Participants should be [illegible] means of verifying the output of indicated staff. [illegible] arranged study tours for 77 [illegible] participants. Figure 7 shows the numbers of participants by year. Participant Teams are selected by the Commission of Schools. In general, a representative group of elementary teachers and curriculum writers have been selected as the participants. A list of participants is given in Appendix F. Figures 8 and 15 show the distribution of the 77 participants by occupational category and by discipline.

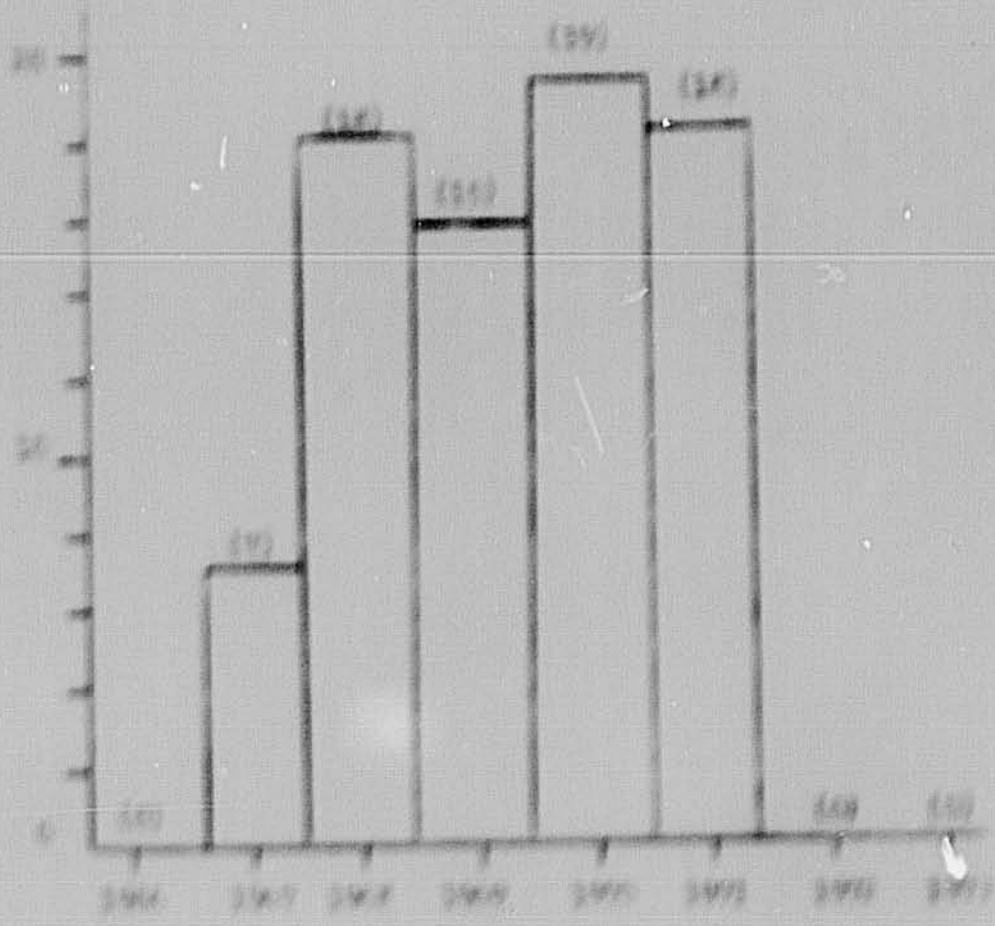

FIGURE 6. CIMAD PARTICIPANT TRAINEES
TOTAL NUMBER = 77

FIGURE 9. USAID PARTICIPANT TRAINEES BY DISCIPLINE

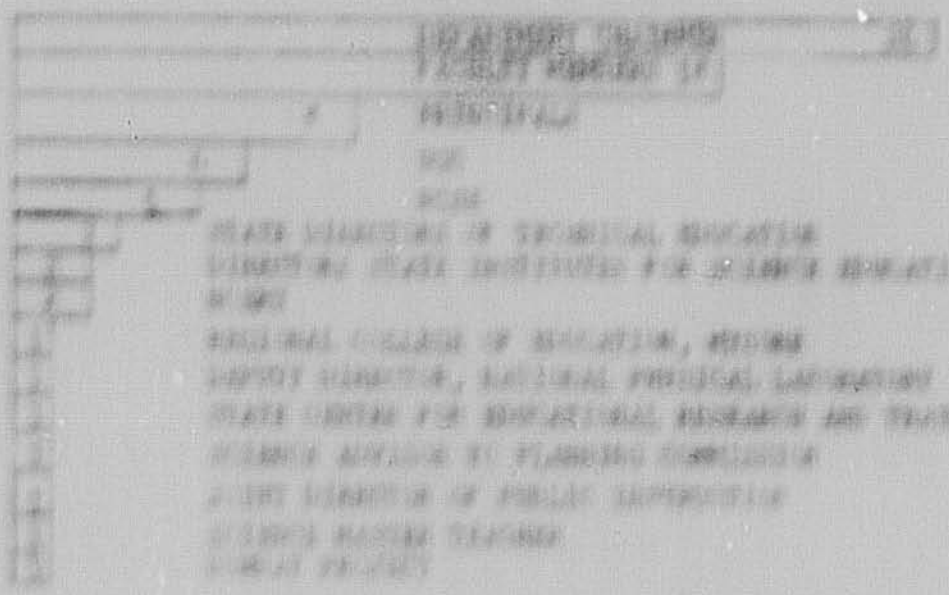

FIGURE 10. USAID PARTICIPANT TRAINEES BY OCCUPATIONAL CATEGORY

Many of the 33 AID Participants can be related directly to the staff positions mentioned in the Project Logical Framework. The following schedule compares the original scope of trained staff with AID Participants.

Scope of Trained Staff

Agency	Targets		Actuals	
MCLS	Curriculum specialists	1	Staff	2
			Curriculum specialists	2
			Faculties	[illegible]
MOE	CTSDP Academic staff		CTSDP Academic staff	
	Deans	1	Deans	1
	Supervisors	1	[illegible] Project Directors	[illegible]
			[illegible] Project Faculty	5
MCDEV	Curriculum specialists	1	Staff	1
			Study Group members*	[illegible]
Tuskegee	Specialists	1	Project Director	1
Syracuse	Regional Colleges of Education specialists		Director of Fulbright Secondary Schools	1
			Dean of Chico Secondary School	
			Secretary of Ministry of Education	1
			[illegible] Regional Colleges of Education specialists	4
Rutgers	Textbook writers	1	VBI	1
Delta	Central schools	1	VBI	

---

* These are individuals in this training. Two managerial level of the MCLS participants were also given as one of the [illegible] Study Group members and to a member of a Project Directorate.

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

2. [illegible]

[illegible]

[illegible]

[

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

APPENDIX A

[illegible]

		$
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
	Total	[illegible]

[illegible]

[illegible] — [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

[illegible]

[illegible] — [illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	-
[illegible]	[illegible]	[illegible]	-	-	[illegible]	-
[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	-
[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	-	-	[illegible]	-
[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]
[illegible]			-	[illegible]	-	[illegible]	[illegible]
[illegible]			-	[illegible]	[illegible]	[illegible]	-
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	[illegible]
[illegible]			-	[illegible]	-	[illegible]	[illegible]
[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

APPENDIX I

[illegible]

PARTICULARS	NET APPROPRIATION
Grant-in-aid to Kakatiya University for the development of new teaching methods, curricula and aid for the development of science education at the undergraduate level. (Backlog expenditure during 1973-74 and 1974-75).	Rs. [illegible]
Building up of a Science Education Centre at Andhra University Campus.	Rs. [illegible]
Organisation of Foreign Science Centres and Science Institutes - Board of Secondary Education, Karnataka.	Rs. [illegible]
Building of a central institute of Industrial Technology, Applied Mathematics and Design of Computers in Technical Institutions of E.P. Government Polytechnic, Madras.	Rs. [illegible]
Building of a Separate or Second Planetary Construction Development at IIT Kanpur.	Rs. [illegible]
Building of a Mining School in Modern Physical Metals in Secondary at IIT Kanpur.	Rs. [illegible]
Building of a Workshop on Test and Evaluation of Solar Repository Laboratory - Osmania University, Hyderabad.	Rs. [illegible]
Publication of the Indian Journal of Technical Education.	Rs. [illegible]
Publication of Science Research Centre.	Rs. [illegible]
Building of a central laboratory for research in Chemistry science at Delhi.	Rs. [illegible]
Modernisation work of the Science Laboratory including synthetic analysis of Data, etc. at IIT Kanpur.	Rs. [illegible]
Building of a two year diploma level Minor Industry in Field Mechanics at IIT Delhi.	Rs. [illegible]
Building of hostel-cum-new supervision detention division for postgraduate faculty in mathematics at E.P. Government Polytechnic, Madras.	Rs. [illegible]
	Rs. [illegible]

[illegible]	[illegible]
[illegible]	Rs. [illegible]
Participation in organization of seminars and conferences in Indian universities — Indian Functional Conferences	Rs. [illegible]
Implementation of the project on Learning Resources — [illegible] Budget	Rs. [illegible]
Grants to Prof. [illegible], Indian Institute, Hyderabad, for auditing psychiatric assistance in connection with the work relating to [illegible] Fund in Hyderabad	Rs. [illegible]
Participation of the Indian Academy of Technical Education	Rs. [illegible]
Holding of a Pan-Phonics Institute for teachers employing [illegible] and [illegible] Graph Series Curriculum at Indian Rubber Industry, Delhi	Rs. [illegible]
Implementation of the project on design and fabrication of Learning Laboratory - equipment and instruments for Physical Instructional Laboratories of [illegible] Budget	Rs. [illegible]
Incorporation of Executive Committee in Phonics for Elementary School Teachers of [illegible] Budget	Rs. [illegible]
Holding of a Mathematics Olympiad for the Class students of Delhi by the Delhi Committee of Mathematics Teachers	Rs. [illegible]
Holding of a Seminar on Particle Mathematics at [illegible] Budget	Rs. [illegible]
Holding of a National Conference of Students - Science Scholarship, Ahmedabad	Rs. [illegible]
Grant-in-aid to Community Science Centre, Ahmedabad (Grant also given during [illegible] and [illegible])	Rs. [illegible]
Grant to the State Institute of Science Education, Bhopal, for organisation for [illegible] Budget as the most successful in holding of seminars in rural secondary schools with the help of science laboratory, and (2) Budget in consideration issues of relevance of the syllabus of secondary and higher secondary schools	Rs. [illegible]
	[illegible]

PARTICULARS	NET EXPENDITURE
B.F.	Rs.12,70,822.16
Setting up of a Graphic Art Workshop at Allahabad Polytechnic.	Rs. 11,500.00
For conducting a Workshop on Project Technology in Bombay.	Rs. 11,500.00
TA & DA payments made to various members of NCSE Panels and other sub-committees on account of their participation in the NCSE sponsored meetings and conferences.	Rs. 44,408.77
Expenditure on Contingencies (This Includes: Rent of the Office Building, Telephone Charges, Water and Electricity Charges, Wages of Staff on daily wages and other miscellaneous expenses.)	Rs. 1,24,170.72
Salaries and allowances of Officers and Staff and contributions of NCSE on salaries.	Rs. 48,656.11
Total	Rs.15,11,057.76

EXPENDITURE INCURRED BY THE NATIONAL COUNCIL FOR SCIENCE EDUCATION DURING FY 1969-70

PARTICULARS	NET EXPENDITURE
Organization of a Winter School in Solid State Chemistry at IIT Kanpur.	Rs. 26,648.83
Publication of the Indian Journal of Chemical Education. (A further sum of Rs.60,000.00 was released for this purpose during 1970-71).	Rs. 20,000.00
Holding of a Seminar with Dr. S.W. Gouse of Carnegie Mellon University -- IIT Delhi	Rs. 5,000.00
Programme of Curriculum Development for the Polytechnic Faculty in Mathematics - preparation of text books, etc. -- S.V. Government Polytechnic, Bhopal. (A further sum of Rs.14,800.00 was released for the continuation of this project during 1970-71).	Rs. 9,200.00
Holding of a Winter School in System Engineering for the benefit of teachers in Engineering Colleges of Southern Region -- P.S.G. College of Technology, Coimbatore.	Rs. 4,227.88
Organization of a Conference on Functional Analysis and Its Applications at IIT Kanpur in collaboration with Indian Mathematical Society.	Rs. 12,522.38
Publication of Science Resource Letter. (A further grant of Rs.60,000.00 was released to IIT Kanpur for this purpose during 1970-71).	Rs. 25,000.00
Programme of development of teaching equipment as a part of the follow-up of Summer Institutes at IIT Kanpur	Rs. 750.00
Grant-in-aid to the Community Science Centre, Ahmedabad for undertaking various projects for the improvement of science education in Gujarat.	Rs. 75,000.00
Organization of Orientation-cum-In-service project for teachers from Bombay Municipal Corporation Schools, TIFR Bombay.	Rs. 21,347.40
Organization of a Course on Molecular Biology of Bacer Bacterial Viruses at the Indian Institute of Science, Bangalore.	Rs. 10,000.00
	Rs.2,09,696.49

PARTICULARS	NET EXPENDITURE
B.F.	Rs.2,09,696.49
TA & DA payments made to various members of NCST Panels and other sub-committees on account of their attending the NCST sponsored meetings and conferences.	Rs. 15,213.91
Expenditure on contingencies (This includes: Rent of Office Building; Telephone Charges; Water and Electricity Charges; Daily Wages of Staff on daily wages and other miscellaneous charges).	Rs.1,17,218.14
Salaries and allowances of Officers and Staff	Rs. 15,388.62
Total	Rs.3,57,517.16

EXPENDITURE INCURRED BY THE NATIONAL COUNCIL FOR SCIENCE EDUCATION DURING FY 1971-72

PARTICULARS		NET EXPENDITURE
Preparation of instructional materials in basic semi-conductors electronics at V.J.T.I., Bombay.	Rs.	28,130.00
In-service training of school teachers of mathematics; M.S. University of Baroda.	Rs.	17,000.00
Organization of ACS Short Course on Infrared Spectroscopy, IIT, Kanpur.	Rs.	4,168.38
Financial assistance to Prof. M.R. Bhide, University of Poona, for fabrication of prototype laboratory equipment.	Rs.	15,000.00
Workshop on Project Technology for teachers of Delhi at IIT, Delhi.	Rs.	10,399.85
Second Winter School in Solid State Chemistry at IIT, Kanpur.	Rs.	37,660.00
Indian Journal of Physics Education, reimbursement of secretarial expenses.	Rs.	4,981.80
Development of special tube for measurement of excitation potential in gases at R. E.C. Kurukshetra.	Rs.	7,400.00
Organization of the first national heat and mass transfer conference at IIT, Madras.	Rs.	20,000.00
Organization of seminar for development of physics instructional laboratory and demonstration apparatus at IIT, Kanpur.	Rs.	9,302.88
Financial assistance for the development of new teaching methods materials and aids for physics education at Aligarh Muslim University, Aligarh.	Rs.	30,123.41
Financial assistance to the Community Science Centre, Ahmedabad.	Rs.	47,891.82
Interdisciplinary Laboratory Course on Environmental Studies, Institute of Science, Bombay.	Rs.	484.90
		Rs.2,32,543.04

PARTICULARS	NET EXPENDITURE
B.F.	Rs.2,32,543.04
"Adaptation of Harvard Project Physics Material in India", Nagpur University.	Rs. 45,000.00
Seminar on creativity and undergraduate science education held in February 1972 at Aligarh Muslim University, Aligarh.	Rs. 11,103.27
Seminar on speech and hearing -- initial expenditure on steering committee meeting at Aligarh.	Rs. 1,000.00
Special program in "Activation Analysis" at the Institute of Science, Bombay.	Rs. 45,800.00
Organization of the ACS Short Course on the "Interpretation of Mass Spectra" held at the Indian Institute of Technology, Madras.	Rs. 6,000.00
Organization of the ACS Short Course on the "Interpretation of Mass Spectra" held at National Chemical Laboratory, Poona.	Rs. 6,000.00
Organization of the ACS Short Course on the "Interpretation of Mass Spectra" held at Central Drug and Research Institute, Lucknow.	Rs. 6,000.00
Organization of a second sequential orientation-cum-implementation project for teaching AISTA study group curriculum at Tata Institute of Fundamental Research, Bombay.	Rs. 25,544.55
Holding of Northern Regional Conference at Rajasthan University, Jaipur, for follow up of the recommendation of chemistry conference held in Srinagar.	Rs. 20,000.00
Organization of Instructional Conference on Hololological Methods in Commutative Algebra at Tata Institute of Fundamental Research, Bombay.	Rs. 32,735.00
Organization of Special Program in Electronics at Indian Institute of Technology, Kanpur.	Rs. 79,918.95
Setting up of Educational Development Centre at IIT, Kanpur.	Rs.2,50,000.00
	Rs.7,61,644.81

PARTICULARS	NET EXPENDITURE
B.F.	Rs. 7,61,644.81
Publication of the First Issue of the Journal of Physics Education.	Rs. 9,772.83
Cost of Glazed Paper	Rs. 10,707.96
Binding Charges	Rs. 8,026.00
Grant-in-aid to IIT Delhi for the setting up of the Bio-Medical Engineering Unit.	Rs. 41,267.88
TA & DA payments made to various sub-committees.	Rs. 35,558.20
Contingencies (This Include: Rent of the Office Building, Telephone charges, Water & Electricity charges, and other miscellaneous expenses.)	Rs.1,27,019.08
Salary and allowances of Officers and Staff and contribution of NCSE on salaries.	Rs. 68,001.52
Total	Rs.10,61,998.28

EXPENDITURE INCURRED BY THE NATIONAL COUNCIL FOR SCIENCE EDUCATION DURING FY 1972-73

PARTICULARS	NET EXPENDITURE
Financial assistance for the holding of a Third Sequential Orientation-cum-Implementation Project for Bombay Corporation Teachers using AISTA Study Group Curriculum Materials.	Rs. 53,900.00
Grant-in-aid to Aligarh Muslim University for the holding of a Seminar on Speech & Hearing.	Rs. 13,800.00
Expenditure incurred by NCSE for the holding of of a Seminar on Teaching of Science, Vocational Courses and Educational Technology at Indian Standards Institution New Delhi.	Rs. 8,143.55
Setting up of an Educational Development Centre, IIT Kanpur.	Rs.1,00,000.00
Financial assistance for the development of new teaching methods, materials and aids for physics education at Aligarh Muslim University.	Rs. 15,390.00
Purchase of 5,000 copies of "Basic Physical and Chemical Data".	Rs. 8,828.00
Preparation of instructional materials in basic semi-conductors electronics at V.J.T.I., Bombay.	Rs. 2,500.00
Financial assistance to the Community Science Centre, Ahmedabad.	Rs.2,00,000.00
Setting up of the Bio-medical Engineering Unit at IIT, Delhi.	Rs.2,65,000.00
Publication of the Indian Journal of Technical Education.	Rs. 20,000.00
Publication of the Indian Journal of Physics Education (2nd and 3rd issues).	Rs. 18,431.89
Publication of the Indian Journal of Chemical Education (7th issue).	Rs. 12,796.84
Printing of Dr. D.S. Kothari's article published in the Physics in India -- Challenges and Opportunities.	Rs. 2,925.78
	Rs.7,21,716.06

PARTICULARS	NET EXPENDITURE
B.F.	Rs.7,21,716.06
Organization of a Conference in the field of Quantum Biology -- AIIMS Delhi.	Rs. 3,933.21
TA & DA payments made to various members of NCSE Panels and other sub-committee/participants on account of their attending the NCSE sponsored meetings/National Science Exhibition.	Rs. 7,993.70
Contingencies (This include: Rent of the Office Building, Telephone charges, Water & Electricity charges, and other miscellaneous expenses).	Rs.1,06,576.55
Salaries and allowances of officers and staff and contribution of NCSE on salaries.	Rs. 60,235.55
TOTAL	Rs.9,00,455.07

EXPECTED EXPENDITURE BY NATIONAL COUNCIL FOR SCIENCE EDUCATION DURING FY 1973-74

PARTICULARS	AMOUNT
Setting up of Bio-medical Engineering Unit" at IIT, Delhi.	Rs.1,00,000.00
Setting up of "Educational Development Centre" at IIT, Kanpur.	Rs.2,00,000.00
Financial assistance to Community Science Centre, Ahmedabad.	Rs.2,00,000.00
Publication of Indian Journal of Chemical Education.	Rs. 32,000.00
Publication of Journal of Physics Education.	Rs. 32,000.00
Publication of Journal of Technical Education.	Rs. 32,000.00
TOTAL	Rs.5,96,000.00

APPENDIX D

EXPENDITURES INCURRED BY THE INDIAN SOCIETY FOR TECHNICAL EDUCATION FOR SUMMER INSTITUTES IN ENGINEERING AND POLYTECHNIC LEVELS

YEAR	EXPENDITURES Rupees
1964-65	48,620
1965-66	375,645
1966-67	614,068
1967-68	1,060,953
1969-70	1,480,989
1970-71	1,637,124
1971-72	1,771,573
1972-73	Information not available

APPENDIX E

TECHNICIANS SERVING DURING CY 1967

Long Term Staff Members (12)*

Name	Position	Dates
ABEL, William H. W. Washington St. College, Bellingham, Wash.	Staff Scientist (Mathematics)	6/20-12/31
DETWILER, Daniel P.** Ohio State University	Staff Scientist (Physics)	1/1-12/31
ELLER, Herbert Southern Technical Institute, Marietta, Ga.	Staff Scientist (Polytechnic)	7/8-12/31
HIEBERT, Gordon L.*** Bowdoin College, Brunswick, Me.	Deputy Head	1/1-12/31
KOPPELMAN, Ray University of Chicago	Head	8/7-12/31
LAURELLI, Ramona NSF/Washington	Secretary	3/3-12/31
MEINERS, Harry F. Rensselaer Polytechnic Institute	Staff Scientist (Materials Development)	10/14-12/31
ORTON, William R. University of Arkansas	Staff Scientist (Mathematics)	9/6-12/31
RILEY, William R. Ohio State University	Staff Scientist (Physics)	4/30-12/31
RUNKIN, R.R. University of Delaware	Staff Scientist (Biology)	1/27-12/31
SHURTLEFF, Miller F. NSF/Washington	Administrative Officer	2/2-12/31
SUSSMAN, Martin V. Tufts University	Staff Scientist (Engineering)	8/6-12/32

* All Staff Members were assigned to New Delhi
** Detwiler arrived in India on 11/27/66
*** Hiebert arrived in India on 8/6/66

TECHNICIANS SERVING DURING CY-1968

Long Term Staff Members (13)

Name	Position	Dates
ABEL, William R. W. Washington St. College, Bellingham, Wash.	Staff Scientist (Mathematics)	1/1-12/31
DETWILER, Daniel P. Ohio State University	Staff Scientist (Physics)	1/1-12/31
ELLER, Herbert Southern Technical Institute, Marietta, Ga.	Staff Scientist (Polytechnic)	1/1-12/31
HIEBERT, Gordon L. Bowdoin College, Brunswick, Me.	Deputy Head	1/1-8/7
KOFFELMAN, Ray University of Chicago	Head	1/1-12/31
LAURELLI, Ramona NSF/Washington	Secretary	1/1-12/31
MEINERS, Harry F. Rensselaer Polytechnic Institute	Staff Scientist (Materials Development)	1/1-12/31
MIKOL, Edward P. University of Wisconsin	Staff Scientist (Engineering)	9/11-12/31
ORTON, William R. University of Arkansas	Staff Scientist (Mathematics)	1/1-9/6
RILEY, William R. Ohio State University	Staff Scientist (Physics)	1/1-9/3
RONKIN, R.R. University of Delaware	Staff Scientist (Biology)	1/1-12/31
SHURTLEFF, Miller F. NSF/Washington	Administrative Officer	1/1-12/31
SUSSMAN, Martin V. Tufts University	Staff Scientist (Engineering)	1/1-8/6

TECHNICIANS SERVING DURING CY-1969

Long Term Staff Members (16)

Name	Position	Dates
ABEL, William R. W. Washington St. College, Bellingham, Wash.	Staff Scientist (Mathematics)	1/1-2/28
ASHBY, Ebert A. Florida State University	Staff Scientist (Biology)	3/14-12/31
BLANFIED, William A. Case Western Reserve University	Staff Scientist (Physics)	8/10-12/31
CHADAY/MMURY, Harriet M. NSF/Washington	Administrative Officer	6/20-12/31
DETWILER, Daniel P. Ohio State University	Staff Scientist (Physics)	1/1-9/1
ELLER, Herbert Southern Technical Institute, Marietta, Ga.	Staff Scientist (Polytechnic)	1/1-7/24
HELLMANN, Max NSF/Washington	Head	9/21-12/31
HUBENE, Harold V. University of Oklahoma	Staff Scientist (Mathematics)	9/23-12/31
KOPPELMAN, Ray University of Chicago	Head	1/1-9/15
LAURELLI, Ramona NSF/Washington	Secretary	1/1-3/3
McGREAL, John E. Ohio Coll. of Applied Science, Cincinnati, Ohio	Staff Scientist (Polytechnic)	8/8-12/31
MEINERS, Harry F. Rensselaer Polytechnic Institute	Staff Scientist (Materials Development)	1/1-10/1
MINOL, Edward P. University of Wisconsin	Staff Scientist (Engineering)	1/1-12/31
O'CONNOR, Paul R. University of Minnesota	Staff Scientist (Chemistry)	3/26-12/31
NEWKIN, R.R. University of Delaware	Staff Scientist (Biology)	1/1-5/19
SHURTLEFF, Miller F. NSF/Washington	Administrative Officer	1/1-1/19

TECHNICIANS SERVING DURING CY-1970

Long Term Staff Members (8)

Name	Position	Dates
ASHBY, Ebert A. Florida State University	Staff Scientist (Biology)	1/1-12/31
BLANFIED, William A. Case Western Reserve University	Staff Scientist (Physics)	1/1-12/31
CHADAYAMMURY, Harriet M. NSF/Washington	Administrative Officer	1/1-12/31
HELLMANN, Max NSF/Washington	Head	1/1-12/31
HUNEKE, Harold V. University of Oklahoma	Staff Scientist (Mathematics)	1/1-12/31
McGREAL, John E. Ohio Coll. of Applied Science, Cincinnati, Ohio	Staff Scientist (Polytechnic)	1/1-12/31
MINOL, Edward P. University of Wisconsin	Staff Scientist (Engineering)	1/1-7/31
O'CONNOR, Paul R. University of Minnesota	Staff Scientist (Chemistry)	1/1-8/28

TECHNICIANS SERVING DURING CY-1971

Long Term Staff Members (11)

Name	Position	Dates
ASHBY, Ebert A. Florida State University	Staff Scientist (Biology)	1/1-12/31
BECKER, Jerry P. Rutgers University	Staff Scientist (Mathematics)	7/26-12/31
BLANPIED, William A. Case Western Reserve University	Staff Scientist (Physics)	1/1-7/31
CHADAYAMMURY, Harriet M. NSF/Washington	Administrative Officer	1/1-6/20
DART, S. Leonard Claremont College	Staff Scientist (Physics)	7/28-12/31
HELLMANN, Max NSF/Washington	Head	1/1-10/22
HIEBERT, Gordon L. NSF/Washington	Head	10/6-12/31
HUNEKE, Harold V. University of Oklahoma	Staff Scientist (Mathematics)	1/1-7/31
McGREAL, John E. Ohio Coll. of Applied Science, Cincinnati, Ohio	Staff Scientist (Polytechnic)	1/1-9/14
O'CONNOR, Paul R. University of Minnesota	Deputy Head	10/6-12/31
WALLACE, Charles W.* Syracuse University	Staff Scientist (Ele. Sci. Edu.)	8/11-12/31

* Wallace was assigned to Bombay

TECHNICIANS SERVING DURING CY-1972

Long Term Staff Members (6)

Name	Position	Dates
ASHEY, Ebert A. Florida State University	Staff Scientist (Biology)	1/1-12/31
BECKER, Jerry P. Rutgers University	Staff Scientist (Mathematics)	1/1-6/30
DART, S. Leonard Claremont College	Staff Scientist (Physics)	1/1-6/30
HIEBERT, Gordon L. NSF/Washington	Head	1/1-12/31
O'CONNOR, Paul R. University of Minnesota	Deputy Head	1/1-12/31
WALLACE, Charles W.* Syracuse University	Staff Scientist (Ele. Sci. Edu.)	1/1-6/22

* Wallace was assigned to Bombay

U.S. Curricular Materials Used in JEIP

1. PSSC. "Physical Science Study Committee". Textbook, teachers' guide, laboratory manual, films, equipment kits. First three reprinted in India by NCERT.

2. CBA. "Chemical Bond Approach". Textbook, teachers' guide, laboratory manual.

3. CHEMS. "Chemical Education Materials Study." Textbook, teachers' guide, laboratory manual, films. First and third reprinted in India by NCERT.

4. "Chemistry: Experiments and Principles." Authorized CHEMS revision. Textbook reprinted in India by NCERT.

5. BSCS. "Biological Science Curriculum Study." Two versions called Yellow and Green. Textbook, teachers' guide, laboratory blocks. Encyclopedia Brittania, American Institute of Biological Sciences, and BSCS films. Yellow version reprinted in India by NCERT.

6. SMSG. "Science Mathematics Study Guide." Textbooks, teachers' guides, elementary through secondary. Reprinted in India by NCERT.

7. ESCP. "Earth Science Curriculum Project." Textbook, teachers' guide, laboratory manual, films.

8. HPP. "Harvard Project Physics." Textbook, resource books, teachers' guide, laboratory guide.

9. TOPS. "The Overhead Projector Sequence." Teachers' guide, equipment kit including overhead projector, "Arm-chair Chemistry" laboratory manual.

10. IPS. "Intermediate Physical Sciences." Textbook laboratory manual, teachers' guide.

11. SCIS. "Science Curriculum Improvement Study" (Elementary Science). Resource material for Delhi and Bombay projects.

12. SPA. "Science Process Approach." Textbook, teachers' guide, laboratory manual, model kits.

13. ACS. American Chemical Society short course materials for mass spectrometry, spectrometric methods, infrared spectroscopy, gas chromatography.

APPENDIX G

1967

Engineering College Teachers (10 U.S. Consultants)	7 7	First year of 3 year sequential institutes Topics: mathematics, linear circuits analysis, electrical and electronic devices Advanced level institutes Topics: soil mechanics, stress analysis, manufacturing processes, fluid mechanics, control systems; numerical analysis, instrumentation
Polytechnic teachers (24 U.S. Consultants)	43	Topics: circuits and measurements, electrical machines, basic electronics, design of structures, highway engineering including elementary soil mechanics, public health engineering, hydraulic engineering including irrigation, heat power engineering refrigeration and air conditioning, engineering materials and heat treatment, manufacturing.
Secondary teachers (79 U.S. consultants)	60	Programs based on curricular materials developed in the U.S. PSSC Physics, CHEMS chemistry, BSCS biology, SMSG mathematics
College teachers (50 U.S. consultants)	50	Five institutes presented specialized subjects: marine biology, animal physiology, modern algebra and operational research, heat and thermodynamics, electronic instrumentation.

1968

Engineering College teachers (15 U.S. consultants)	3	First year of three year sequential institutes
	7	Second year of three year sequential institutes Topics: Electrical engineering: network theory, control systems, energy conversion, electrical engineering materials, electromagnetic fields, power systems, high voltage engineering, instrumentation, high voltage D.C. systems. Civil engineering: structural behavior design, soil mechanics and foundation engineering, principles of water and water treatment, design of folded plate and shell structures, soil dynamics, theoretical soil mechanics, open channel hydraulics, sanitary chemistry and microbiology. Mechanical engineering: applied mathematics, materials technology, instrumentation and control, computer science, gas turbines, gas dynamics, heat transfer, fluid mechanics, applied elasticity and plasticity, experimental stress analysis, metal processing, production engineering, metallography and heat treatment, fans and compressors, fuels, combustion, refractories.
	7	Advanced level institutes. Topics: numerical analysis, design processes, structural engineering, vibration control, soil mechanics, digital computation and control, materials science.

Polytechnic teachers (25 U.S. consultants)	12 10 2	First year of sequential institutes Second year of sequential institutes Advanced level.
Secondary teachers (69 U.S. consultants)	61	Four SSIs offered, Specialised programs, for teachers from training colleges.
College teachers	61	Nine SSIs offered, Specialized topics: ecology, genetics, comparative endocrinology, food and nutrition, functional analysis, solid state physics.
1969		
Engineering teachers (25 U.S. consultants)	6 2 7 10	First year of three year sequential institutes. Second year of three year sequential institutes. Third year of three year sequential institute. Advanced level institutes Topics: Computational techniques in control system design, materials science, numerical analysis, textile engineering, design of chemical process equipment, structural engineering, fluidics and control engineering, solid state devices, fluvial hydraulics.
Polytechnic teachers (19 U.S. consultants)	12 12 15 7	First year of three year sequential institutes Second year of three year sequential institutes Third year of three year sequential institutes Advanced level institutes Topics: Industrial engineering, laboratory design, physics, foundry technology, production technology, industrial electronics, semi-conductor devices, circuits.

Secondary teachers (39 U.S. consultants)	60	Three SDIs offered new programs. Earth Science Curriculum Project presented for first time. Special institutes included physics at NCERT and a sequential institute for mathematics teachers. Three institutes for science methods teachers. Two institutes used NCERT Study Group materials.
College teachers (35 U.S. consultants)	[illegible]	Six institutes were devoted explicitly to affiliating college teachers. Two special institutes presented the Harvard Project Physics curriculum. Twelve institutes presented specialized topics: microbiology, genetics, marine biology, inorganic chemistry, operational research, abstract algebra, linear analysis and partial differential equations, advanced statistical inference and sample surveys, applied physics, solid state physics, electronic instrumentation, food and nutrition.
1970		
Engineering College teachers (1[illegible] U.S. consultants)	3 6 4 12	First year of three year sequential insitutes Second year of three year sequential institutes Third year of three year sequential institutes Advanced level institutes. Topics: ground water engineering and hydrology, rock mechanics, measurement techniques in electrical engineering, industrial engineering, design engineering, computing, experimental stress analysis, material science, process dynamics and control, semi-conductor electronics, Fluids and control engineering.

Polytechnic teachers (15 J. S. consultants)	12 15 9 15	First year of three year sequential institutes Second year of three year sequential institutes Third year of three year sequential institutes Advanced level institutes Topics: structural engineering, soil mechanics, electrical instrumentation industrial engineering (5 centers), air conditioning and refrigeration, machine tool technology, production technology, automobile technology, examination techniques, programmed writing.
	1 1	Sequential institute for art teachers Advanced level printing technology
Secondary teachers (20 J. S. consultants)	60	Four special institutes: NCERT Study Group materials in chemistry; pedagogy; writing SSI in physics; elementary science teachers.
College teachers (19 J.S. consultants)	56	Twenty eight specialized topics: applied biology, ecology, genetics, marine biology and oceanography; college development, test construction and evaluation, spectroscopy, food and nutrition (2 locations); modern algebra, functional analysis and topology, operational research, theory of partial differential equations, advanced statistical inference, inference with Markov chains; theoretical physics (sequential) electronics, solid state, Moire techniques, molecular structure, electronic instrumentation. (More than one SSI for a number of these topics.)

1971

Engineering college teachers (5 U. S. consultants)	12 13	Sequential institutes Advanced level institutes.
Polytechnic teachers (7 U. S. consultants)	29 10	Sequential institutes Advanced level
Secondary teachers (1 U. S. consultants)	64	Two for teacher educators One for teachers of Poona City One for teachers from Sainik schools (for dependents of military).
College teachers (7 U. S. consultants)	53	Three for affiliated college teachers of new universities. Twenty three special topics: plant physiology, applied biology, applied microbiology, micro and molecular biology, geology, earth sciences (3), analytical chemistry, activation analysis, solid state physics (2) electronic instrumentation, diffraction physics, advanced spectroscopy, mathematical analysis, functional analysis, recent advances in K-Theory, numerical analysis, operations research, abstract harmonic analysis, probability theory, statistics stochastic processes and applications.

1972

Engineering College teachers	0 21	Sequential institutes Advanced level (two were scheduled for the winter vacation period).

Polytechnic teachers	26 15	Advanced level Sequential institutes
Secondary teachers	63	For the first time, school level SDIs organised and funded by NCERT. The materials developed at NCERT with assistance of UNESCO consultants used as the SDI program
College teachers	53	The brochure announcing the SDIs gave a unique description of the program at each institution.

APPENDIX H

Short Term Consultants (173) CY-1967

Name	Field/Level	Dates	Place Assigned
AGRE, Courtland L. Augsburg Coll., Mpls., Minn.	Chemistry/College	5/6-6/29	Aligarh
AKKERMAN, Richard P. Univ. of Houston	Civil Engr.(Polytech)	5/29-7/27	Gauhati
AUFFENBERG, Walter Univ. of Florida	Biology/School	4/16-6/13	Madurai
BACHMAN, Charles Syracuse Univ.	Physics/College	4/23-6/13	Waltair
BAXTER, John F. Univ. of Florida	Chemistry	6/11-7/29	Various Places
BECKER, Jerry P. Stanford Univ.	Mathematics/School	5/7-7/22	Patna
BETZ, Joseph Garfield H.S., Seattle, Wash.	Mathematics/School	4/24-6/13	Bangalore
BLANPIED, William A. Case Inst. of Tech.	Physics/College	4/28-6/20	Sagar
BLASS, Gerhard A. Univ. of Detroit	Physics/College	4/23-6/17	Baroda
BOAL, Jan List Univ. of S. Carolina	Mathematics/College	5/7-7/15	Patna
BOEKELHEIDE, Irving F. Chico State Coll., Chico, Cal.	Physics/College	5/8-6/25	Gauhati
BOREN, Gerald J. Rockhurst H.S., Kansas City, Mo.	Physics/School	4/30-6/20	Sagar
BRASTED, Robert C. Univ. of Minnesota	Chemistry	5/31-7/1	Various Places
BROBERG, Joel W. North Dakota State Univ.	Chemistry/School	4/21-6/15	Nagpur
BROWN, Charles K. Westtown School, Westtown, Pa.	Mathematics/School	4/23-6/13	Calcutta

Name	Field/Level	Dates	Place Assigned
BUCY, David A. Oregon State Univ.	Mechanical Engg.(Polytech)	4/28-7/1	Ahmedabad
BURNET, George Iowa State Univ.	Chemical Engg.	4/23-7/8	Kharagpur
BUSH, Kenneth H. West Lafayette H.S., West Lafayette, Ind.	Biology/School	5/7-6/27	Agra
CAFFEY, James E. Arlington State Coll., Arlington, Texas	Civil Engg. (Polytech)	5/8-7/13	Allahabad
CAMIOLO, Sarah M. D'Youville Coll., Buffalo, N.Y.	Chemistry/School	4/14-6/10	Ernakulam
CAMPBELL, Wallace G. Ateneo De Manila Univ., Manila, Phil. I.	Mathematics/School	4/23-6/13	Trivandrum
CAROTENUTO, Albert N. Morristown H.S., Morristown, N.J.	Chemistry/School	5/8-7/1	Varanasi
CHOGUILL, Harold S. Fort Hays Kansas St. Coll.	Chemistry/College	5/7-6/27	Kurukshetra
CHURCH, Austin H. New York Univ.	Mechanical Engg.	5/1-7/13	Madras
CLARK, Dayle M. Arlington State Coll., Arlington, Texas	Civil Engg. (Polytech)	5/29-8/5	Chandigarh
COBB, Emerson G. Univ. of the Pacific, Stockton, Cal.	Chemistry/College	5/10-6/28	Poona
CRAFT, Thomas J. Central State Univ., Wilberforce, Ohio	Biology/College	5/7-6/29	Ahmedabad
CRENSHAW, John W. Univ. of Maryland	Biology/College	7/9-8/25	Srinagar
CRNKOVICH, Joseph G. Wauwatosa H.S., Wauwatosa, Wis.	Physics/School	5/15-7/11	Allahabad
CRUM, James D. California State Coll., San Bernardino, Cal.	Chemistry/College	5/7-7/1	Cuttack

Name	Field/Level	Dates	Place Assigned
DENNY, Wayne B. Grinnell Coll., Grinnell, Iowa	Physics/School	5/7-6/29	Gauhati
DIAZ Granados, F.A. Flintridge Prep. School, Pasadena, Cal.	Physics/School	5/7-6/28	Varanasi
DOLLARD, Peter M. State Univ. of N.Y., Stonybrook, N.Y.	Electrical Engg.(Polytech)	5/22-7/27	Gauhati
DOTHITT, Clair D. Chief Sealth H.S., Seattle,Wash.	Chemistry/School	5/28-7/18	Patna
DRENLER, Henry E. Pious XI H.S., Milwaukee, Wis.	Biology/School	4/23-6/13	Chandigarh
DUDLEY, Frank M. Univ. of South Florida	Chemistry/School	4/23-6/17	Chandigarh
DUFF, James W. Arlington State Coll., Arlington, Texas	Polytechnic	5/29-8/12	Various Places
DUNN, Donald J. Phillips Univ., Enid, Ok.	Biology/College	5/7-7/22	Patna
ELICH, Joe Utah State Univ.	Mathematics/School	4/23-6/13	Bhopal
EVERT, Carl F., Jr. Univ. of Cincinnati	Electrical Engg.	5/15-6/20	Madras
FAIRBANKS, Alan E. Alfred State Coll., Alfred, N.Y.	Mechanical Engg.(Polytech)	5/7-7/11	Allahabad
FARREN, Joseph M. Univ. of Dayton, Dayton, Ohio	Electrical Engg.(Polytech)	4/24-7/1	Ahmedabad
FERGUSON, Harold W. Harriton H.S., Bosemont, Pa.	Chemistry/School	5/15-7/6	Jodhpur
FLANAGAN, James C. Del Mar Coll., Corpus Christi, Texas	Mechanical Engg.(Polytech)	5/28-8/19	Chandigarh
FLETCHER, William H. Broad Ripple H.S., Indianapolis, Ind.	Chemistry/School	4/16-6/10	Annamalainagar

Name	Field/Level	Dates	Place Assigned
FONTANA, Peter R. Univ. of Michigan	Physics/College	4/24-6/15	Baroda
FOWLER, Edgar T. Southern Tech. Inst., Marietta, Ga.	Civil Engg. (Polytech)	5/1-7/1	Bhopal
FRANK, Andrew J. W. Washington St. Coll., Bellingham, Wash.	Chemistry/College	5/7-6/29	Jaipur
GARDNER, Robert Educational Services Inc., Newton, Mass.	Physics/School	5/7-6/27	Ajmer
GIBBONS, James F. Stanford Univ.	Electrical Engg.	4/30-5/22	Baroda
GIPSON, Jeffery St. Augustine's Coll., Raleigh, N.C.	Chemistry/School	4/21-6/13	Bangalore
GIST, Lewis A. NSF/Washington	Chemistry	4/3-5/12	Various Places
GOODNER, Dwight B. Florida State Univ.	Mathematics/College	4/21-6/9	Madurai
GORSHT, Frank B. Bettendorf Comm. S., Bettendorf, Iowa	Chemistry/School	5/8-7/1	Ujjain
GURFINKEL, German R. Univ. of Illinois	Civil Engg.(Polytech)	5/29-8/2	Madras
GUSTAFSON, Robert D. Purdue Univ.	Electrical Engg.	5/29-6/29	Pilani
HADJIMINOS, James Stephen F. Austin Coll., Nacogdoches, Texas	Physics/School	4/28-6/13	Waltair
HARRIS, Reece T. Univ. of Maryland	Mathematics/College	5/7-6/28	Lucknow
HAUPT, Robert E. Iowa State Univ.	Biology/College	4/12-6/16	Mysore
HAYGOOD, Neal T. Wakefield H.S., Arlington, Va.	Chemistry/School	5/14-7/6	Kolhapur
HEADLEE, Elmer W. Kirkwood H.S., Kirkwood, Mo.	Chemistry/School	4/23-6/17	Calcutta

Name	Field/Level	Dates	Place Assigned
HEIKKINEN, Henry W. Richfield H.S., Richfield, Minn.	Chemistry/School	5/22-7/14	Lucknow
HERZOG, John O. Idaho State Univ.	Mathematics/School	5/7-6/29	Kanpur
HIGGENSON, Charles A. Mohawk Valley Comm. Coll., Utica, N.Y.	Mechanical Engg.(Polytech)	4/23-6/29	Bhopal
HILL, Philip G. Mass. Inst. of Tech.	Engineering	5/14-6/24	Howrah
HOFFMAN, Richard Phoenix Union H.S., Phoenix, Ariz.	Biology/School	5/7-6/29	Gorakhpur
HOHL, Sister Mary C. Marygrove Coll., Detroit, Mich.	Chemistry/School	4/23-6/15	Bhopal
HORWITZ, Henry E. Dutchess Comm. Coll., Poughkeepsie, N.Y.	Mechanical Engg.(Polytech)	5/29-9/1	Madras
HUGDAHL, Wallace I. Homestead H.S., Mequon, Wis.	Chemistry/School	5/24-7/18	Patna
HUTTON, Wilbert Bowling Green St. Univ., Bowling Green, Ohio	Chemistry/College	5/7-6/29	Gorakhpur
JENSEN, Berlin C. Roy H.S., Roy, Utah	Biology/School	5/7-6/29	Aurangabad
JENSEN, James LaMont Roy H.S., Ogden, Utah	Biology/School	5/7-6/29	Ranchi
KAPLAN, Harvey Syracuse Univ.	Physics/College	5/8-6/27	Delhi
KARPLUS, Walter J. Univ. of Cal., Los Angeles	Engineering	5/29-6/17	Various Places
KASTRINOS, William Educational Testing Service, Princeton, N.J.	Biology/School	5/1-6/17	Bhubaneswar
KELLER, Henry P. The Peddie School, Hightstown, N.J.	Physics/School	5/15-7/4	Allahabad
KENNEDY, Manert F. Univ. of Colorado	Biology/School	4/23-6/13	Madurai

Name	Field/Level	Dates	Place Assigned
KETTERER, Frederick D. Univ. of Pennsylvania	Engineering	5/14-6/24	Calcutta
KOONS, Lawrence F. Tuskegee Inst.	Chemistry/School	5/24-7/12	Lucknow
KOWALSKI, Stephen W. Montclair State Coll.	Chemistry	4/10-7/15	Various Places
KULLER, Robert G. Wayne State Univ.	Mathematics/College	4/16-6/8	Poona
KOMLER, Marion L. Southern Illinois Univ.	Biology/School	4/23-6/13	Chandigarh
KURTH, Rodolf Georgia Inst. of Tech.	Mathematics/College	4/23-6/17	Dharwar
LAMBERT, Francis L. Union Coll., Schenectady, N.Y.	Biology/College	4/16-6/8	Trivendrum
LAMBERT, Henry A., Jr. Lamar State Coll. of Tech., Beaumont, Texas	Mechanical Engg.(Polytech)	5/29-7/29	Gauhati
LAWRENCE, Willard E. Marquette Univ., Milwaukee, Wis.	Mathematics/School	5/15-7/8	Gwalior
LEACH, James L. Univ. of Illinois	Engineering	5/14-8/5	Coimbatore
LEE, Ralph Hewitt Alabama Ag. & Mech. Coll., Normal, Al.	Chemistry/School	4/16-6/8	Ernakulam
LEEDS, Clarence W. III Berkshire School, Sheffield, Mass.	Mathematics/School	5/7-6/27	Kurukshetra
LEFF, Edward Queens Borough Comm. Coll., Bayside, N.Y.	Electrical Engg.(Polytech)	5/8-7/13	Bangalore
LEVY, Norton Brookline H.S., Brookline, Mass.	Mathematics/School	5/29-7/13	Bhagalpur
LEWIN, Ruth L. Hunter Coll., N.Y., N.Y.	Chemistry/College	5/8-6/29	Waltair
LIEBHERR, Hal Nicolet H.S., Milwaukee, Wis.	Biology/School	5/7-6/29	Hyderabad

Name	Field/Level	Dates	Place Assigned
LIGHTHALL, Harry, Jr. Univ. of Vermont	Mathematics/College	4/14-6/12	Nagpur
LITTLE, Clifford Hill School, Pottstown, Pa.	Physics/School	6/2-7/18	Lucknow
LITTLE, Richard A. Culver, Mil. Acad., Culver, Ind.	Mathematics/School	5/8-7/1	Kanpur
LUCE, Ernest S. Univ. of Houston	Electrical Engr.(Polytech)	5/29-8/2	Madras
MADSEN, Arthur P. Teaneck H.S., Teaneck, N.J.	Physics/School	4/16-6/9	Alwaye
MAJOR, John K. NSF/Washington	Physics/College	4/16-6/9	Mysore
MALONE, James V. Univ. of Houston	Electrical Engr.(Polytech)	5/28-8/12	Chandigarh
MANN, Nathaniel III Public School of W. & M., Conn.	Mathematics/School	4/23-6/15	Bhopal
MASON, Lyala C. Phillips Univ., Enid, Ok.	Mathematics/School	5/24-7/18	Bhagalpur
McCARTHY, David F. Mohawk Valley Comm. Coll., Utica, N.Y.	Engineering	5/8-7/12	Various Places
McNEIL, Edward B. Univ. of Illinois, Rome	Physics	4/23-7/18	Various Places
METZNER, Kenneth A.W. Brookhaven National Lab.	Physics/School	4/29-6/19	Bangalore
MILLER, Bruce L. Flint Comm. Coll., Flint, Mich.	Industrial Electronics (Polytech)	5/8-8/26	Bombay
MILLER, Donald E. Mercer Island School, Mercer Island, Wash.	Physics/School	5/3-6/20	Bhubaneswar
MILLER, Roy D. Forest View H.S., Arlington Hts., Ill.	Chemistry/School	5/14-7/6	Kolhapur
MILSTEAD, William W. Univ. of Missouri	Biology/School	5/7-7/1	Hyderabad

Name	Field/Level	Dates	Place Assigned
MITCHELL, Henry A. Univ. of Missouri	Biology/School	5/7-6/29	Ranchi
MORTON, Richard F. Worcester Polytechnic Inst.	Physics/School	4/17-6/1	Alwaye
MOSLEY, Albert J. Keene State Coll., Keene, N.H.	Mathematics/School	7/7-9/2	Srinagar
MURPHY, Donald J., Jr. State Univ. of N.Y., Farmingdale, N.Y.	Civil Engg.(Polytech)	5/8-7/13	Bangalore
MYERS, Donald E. Univ. of Arizona	Mathematics/School	7/9-9/2	Srinagar
NEWMAN, Elaine B. Western Reserve Univ.	Biology/School	5/7-7/21	Aurangabad
NYCE, John D. Goshen Coll., Goshen, Ind.	Mathematics/School	5/12-7/5	Jabalpur
OSTERBERG, Jorj O. Northwestern Univ.	Civil Engg.	5/15-6/17	Delhi
OWEN, H. Malcolm Univ. of the South	Biology/College	4/16-6/6	Annamalainagar
PADDOCK, Elton F. Ohio State Univ.	Biology/College	4/23-6/10	Jaipur
PEACOCK, Ben N. Wauwatosa Board of Educ., Wauwatosa, Wis.	Physics/School	5/1-6/22	Annamalainagar
RAMSEUR, George S. Univ. of North Carolina	Biology/College	5/10-7/1	Varanasi
REID, Theodore L. Univ. of South Dakota	Chemistry/School	5/7-7/1	Ujjain
REYNOLDS, Thomas Duke Univ.	Mathematics/College	4/16-6/8	Madurai
RIGGS, Charles L. Texas Tech. Coll.	Mathematics/School	5/7-6/29	Jaipur
RIO, Sheldon T. Southern Oregon Coll.	Mathematics/College	5/7-6/24	Delhi

Name	Field/Level	Dates	Place Assigned
ROONEY, Victor M. Univ. of Dayton	Electrical Engg.(Polytech)	4/29-7/1	Bhopal
ROUSE, Arthur G. St. Louis Univ., St. Louis, Mo.	Physics/School	4/21-6/13	Chandigarh
RYAN, Donald E. Bowling Green St. Coll., Bowling Green, Ohio	Mathematics/College	5/7-6/29	Baroda
SALYER, Darnell Eastern Kentucky Coll., Richmond, Ky.	Chemistry/School	5/19-7/6	Jodhpur
SCHLUETER, Donald J. Purdue Univ.	Physics/College	5/8-6/29	Calcutta
SCHNEIDER, Hubert H. Univ. of Nebraska	Mathematics/School	6/11-8/5	Gauhati
SCHROT, Robert Yuba City H.S., Yuba City, Cal.	Biology/School	5/28-7/13	Delhi
SCHWENGEL, James D. Wm. Henry Harrison H.S., Evansville, Ind.	Biology/School	5/15-7/8	Ahmedabad
SEVERIN, Charles F. St. Mary's Coll., Winona, Minn.	Biology/School	4/14-6/10	Calicut
SHARRAH, Paul C. Univ. of Arkansas	Physics/School	4/23-6/15	Vallabh Vidyanagar
SHERMAN, Noah Univ. of Michigan	Physics/College	4/23-6/22	Chandigarh
SHUTTS, C. Francis Cal. State Coll., San Bernardino, Cal.	Biology/College	5/7-8/26	Bombay
SIMPSON, James E. Univ. of Kentucky	Mathematics/College	5/7-6/29	Jaipur
SLABY, Harold T. Wayne State Univ.	Mathematics/College	4/16-6/7	Chandigarh
SPENCER, James A. Choate School, Wallingford, Conn.	Chemistry/School	5/7-6/29	Waltair
SPINDLE, Jackson F. Cypress Jr. Coll., Cypress, Cal.	Chemistry/School	5/7-7/1	Hyderabad

Name	Field/Level	Dates	Place Assigned
STARKE, Emory P. Bloomfield Coll.	Mathematics	3/27-7/27	Various Places
STARR, Donald Alex. Ham. Found., Plymouth, Mich.	Chemistry/College	4/17-7/10	Vallabh Vidyanagar
STEELE, Stephen G. Broome Tech. Comm. Coll.	Polytechnic	5/29-8/12	Various Places
STERN, Jacob Michigan State Univ.	Mfg. Processes(Polytech)	5/7-7/11	Coimbatore
STRICKLER, Thomas Berea Coll., Berea, Ky.	Physics/College	5/10-6/27	Gauhati
SUMMERLIN, Lee R. Florida State Univ.	Chemistry/College	4/23-6/17	Nagpur
SUNDERWIRTH, S.G. Kansas State Coll.	Chemistry/College	4/16-6/6	Annamalainagar
SUTMAN, Frank X. Temple Univ.	Chemistry/School	4/19-6/13	Bangalore
SWARD, Paul L. U.S. Department of Interior	Biology/School	4/14-6/10	Calicut
TAYLOR, Marie G. Howard Univ.	Biology/School	5/14-7/7	Poona
TELFAIR, David Earlham Coll.	Physics/College	5/21-7/8	Bombay
THOMO, Dmitri E. San Jose State Coll., San Jose, Cal.	Mathematics/School	5/7-6/29	Jaipur
THRON, Wolfgang J. Univ. of Colorado	Mathematics/College	5/9-6/29	Jodhpur
THURSTON, Charles W. Columbia Univ.	Civil Engr.	6/4-7/15	Sindri
TOALSON, Wilmont Fort Hays Kansas St. Coll.	Mathematics/College	4/23-6/17	Bangalore
TOMPSON, Robert N. Univ. of Nevada	Mathematics/School	5/15-7/6	Gwalior
TROLAN, J. Kenneth Univ. of Redlands, Redlands, Cal.	Physics/College	5/7-6/30	Varanasi

Name	Field/Level	Dates	Place Assigned
TULECKE, Waltair R. Boyce Thompson Inst., Yonkers, N.Y.	Biology/College	4/21-7/10	Hyderabad
VANCE, J. David Gaston Coll., Gastonia, N.C.	Civil Engg.(Polytech)	4/25-6/29	Ahmedabad
VAUGHN, Charles M. Miami Univ.	Biology/College	4/23-6/15	Jaipur
VOGELI, Barry D. Mount Union Coll., Alliance, Ohio	Mathematics/School	4/23-7/1	Hyderabad
WAGGONER, Wm. H., Jr. Univ. of Georgia	Chemistry/College	4/16-6/6	Mysore
WARREN, Edgar Denver Pub. School	Biology/School	5/15-7/6	Ahmedabad
WATSON, Joseph T. (Rev.) Brooklyn Prep. School, Brooklyn, N.Y.	Physics/School	5/7-6/29	Udaipur
WATTERS, James I. Ohio State Univ.	Chemistry/College	5/15-7/1	Ujjain
WEBBER, Frederick A. Wayne State Coll.	Mathematics/School	6/11-8/3	Gauhati
WEHN, Donald State Univ. of N.Y., Stonybrook, N.Y.	Mathematics/College	4/23-6/17	Jadavpur
WHITE, Paul A. Univ. of South California	Mathematics	5/22-6/23	Various Places
WILCOX, Harold E. Cal. Inst. of Tech.	Chemistry/College	5/8-6/29	Varanasi
WILSON, Dale G. Purdue Univ.	Mechanical Engg.(Polytech)	5/8-7/13	Bangalore
WOODS, Roger D. San Bernardino Valley Coll., San Bernardino, Cal.	Physics/School	4/24-6/16	Aurangabad
YOUNGBLOOD, Ralph P. Georgia Inst. of Tech.	Electrical Engg.(Polytech)	5/12-7/15	Allahabad

Short Term Consultants (187) CY-1968

Name	Field/Level	Dates	Place Assigned
ALLDISTEIN, Richard V. Univ. of Wisconsin, Waukesha, Wis.	Chemistry/School	5/6-7/5	Varanasi
ANDERSON, Jack M. Iowa State Univ.	Mathematics/College	5/5-7/3	Calcutta
ASHBY, Ebert A. Univ. of Texas	Biology/College	4/5-5/31	Trivandrum
ASIMOW, Robert M. Univ. of Maryland	Design Processes & Materials (Engineering)	5/6-6/15	Coimbatore
AUCLAIR, Walter Rensselaer Polytechnic Inst.	Biology/College	4/29-6/16	Poona
BARTLE, Robert G. Univ. of Illinois	Mathematics/College	5/5-7/3	Jodhpur
BARTON, Jay II West Virginia Univ.	Biology/College	4/8-6/5	Mysore
BECKER, Jerry P. Rutgers Univ.	Mathematics/School	5/6-6/28	Kanpur
BERRY, Jesse E. Prairie View A. & M. Coll., Praire View, Texas	Biology/School	5/26-7/19	Delhi
BIRDWHISTELL, Ralph K. Univ. of West Florida	Chemistry/College	5/1-6/19	Vallabh Vidyanagar
BLANFIED, William A. Case Inst. of Tech.	Physics	6/1-7/1	Various Places
BLANTON, Mathew S., Jr. Univ. of Texas, Arlington, Texas	Industrial Electronics (Polytech)	5/17-7/3	Bhopal
BLISS, Laura Randolf-Macon Women's Coll., Va.	Chemistry/School	4/28-6/19	Ahmedabad
BOAL, Jan List Univ. of South Carolina	Mathematics/College	5/5-7/1	Dibrugarh

Name	Field/Level	Dates	Place Assigned
BOSER, Gerald J. (Rev.) Rockhurst H.S., Kansas City, Mo.	Physics/School	5/19-7/12	Gauhati
BOYAJIAN, Richard J. Univ. of Chicago Lab. School	Biology/School	4/28-7/7	Bhubaneswar & Vizag
BRASTED, Robert C. Univ. of Minnesota	Chemistry	4/26-5/31	Various Places
BRINSON, John W. George Washington H.S., Denver, Col.	Biology/School	4/28-6/21	Madras
BRICKER, Clark E. Univ. of Kansas	Chemistry/College	5/22-7/11	Poona
BROWN, Fayette J. Chico State Coll., Chico, Cal.	Industrial Engr. (Polytech)	5/26-7/21	Chandigarh
BROWN, Frederick C. Univ. of Illinois	Physics	12/30/68 - 1/18/69	Various Places
BROWN, Robert T. Mich. Tech. Univ., Houghton, Mich.	Biology/School	4/21-6/24	Gorakhpur
BRUMBERGER, Harry Syracuse Univ.	Chemistry/College	5/10-7/3	Waltair
BRYAN, John H.D. Univ. of Georgia	Biology/College	4/28-6/19	Bombay
BUCY, David A. Univ. of Washington	Physical Metallurgy (Polytech)	6/9-7/28	Hyderabad
BURGE, Jack D. Medical Coll. of Virginia, Richmond, Va.	Biology/College	4/28-6/14	Jaipur
CAMIOLO, Sarah M.(Miss) American Univ., Wash, D.C.	Chemistry/School	5/5-6/30	Annamalainagar
CARDINUTO, Albert M. Morristown H.S., Morristown, N.J.	Chemistry/School	4/22-6/18	Jaipur
CHOGUILL, Harold B. Fort Hays Kansas State Coll.	Chemistry/College	5/5-6/29	Annamalainagar
CHURCH, Austin H. New York Univ.	Vibration Control (Engr.)	5/29-7/11	Kharagpur

Name	Field/Level	Dates	Place Assigned
CLAPP, Llewellyn E. Brown Univ.	Chemistry/School	5/10-6/27	Patna
CLARK, Doyle M. Univ. of Texas, Arlington, Va.	Asphalt Tech. (Polytech)	5/27-6/21	Chandigarh
CLEM, I. Williams Univ. of Florida	Biology/College	4/21-6/19	Ahmedabad
COLEMAN, Robert M. Boston Coll.	Biology/College	5/5-6/28	Gorakhpur
COMSTOCK, Dale R. Central Wash. State Coll., Ellensburg, Wash.	Mathematics/School	4/17-6/14	Aurangabad
COSTOPOULOS, James E. Dutchess Comm. Coll., Poughkeepsie, N.Y.	Architecture (Polytech)	5/27-7/19	Madras
COWAN, Clifford W. Southern Tech. Inst., Marietta, Ga.	Basic Electronics (Polytech)	5/27-7/28	Hyderabad
CRAFT, Thomas J. Central State Univ., Wilberforce, Ohio	Biology/College	4/20-6/14	Hyderabad
CREIGHT, Harriet B. Wellesley Coll.	Biology/College	5/5-7/17	Hyderabad
CSANOVICH, Joseph G. Wauwatosa H.S., Wauwatosa, Wis.	Physics/School	5/6-7/5	Varanasi
CSUM, James D. California State Coll., San Bernardino, Cal.	Chemistry/College	5/5-7/5	Varanasi
CRUZ, Jose B. Univ. of Illinois	Electrical Eng.	5/5-6/26	Kharagpur
CUNNINGHAM, William E. Redlands Sr. H.S., Redlands, Cal.	Physics/School	4/22-6/18	Mysore
DART, S. Leonard Claremont Coll.	Physics/College	4/22-6/30	Aligarh
DAVIS, Joseph E., Jr. Univ. of Cal., Berkeley, Cal.	Chemistry/School	4/28-6/21	Ahmedabad
DeFAGGAGIS, Henry F. Fordham Univ.	Mathematics/School	5/5-6/27	Hyderabad

Name	Field/Level	Dates	Place Assigned
DENNY, Wayne B. Grinnell Coll.	Physics/School	5/19-7/11	Gauhati
DESNOYERS, Harold B. Westchester Comm. Coll., Valhalla, N.Y.	Industrial Electronics (Polytech)	5/5-6/28	Ahmedabad
DeVILLAFRANCA, George W. Smith Coll.	Biology/College	5/19-7/12	Chandigarh
DIEFENDERFER, A. James Lehigh Univ.	Chemistry/College	4/21-6/12	Jaipur
DILL, Normal H. Del. State Coll., Dover, Del.	Biology/School	5/19-7/21	Ranchi
DILLON, Thomas J. Concord-Carlisle H.S., Concord, Mass.	Physics/School	5/5-6/26	Udaipur
DUFF, James W. Arlington State Coll., Arlington, Texas	Hydraulics Irrigation & Public Health (Polytech)	5/26-7/21	Bangalore
DUNN, Donald J. Oklahoma Christian Coll., Oklahoma City, Ok.	Biology/School	4/21-6/30	Various Places
EHELING, Water Univ. of Cal., Los Angeles	Biology/College	4/28-6/28	Poona
EISNER, Leonard Barnes Engr. Co., Stamford, Conn.	Physics/School	4/28-6/20	Sagar
ELSTIS, Robert H. Stanford Univ.	Mechanical Engr.	5/15-7/1	Madras
EVERT, Carl F., Jr. Univ. of Cincinnati	Numerical Analysis(Engr.)	5/6-6/14	Madras
FAITH, Carl C. Rutgers Univ.	Mathematics/College	4/21-8/16	Delhi
FAN, H.Y. Purdue Univ.	Physics	12/30/68- 1/18/69	Various Places
FAST, Kenneth V. Webster Coll., St. Louis, Mo.	Chemistry/School	5/12-7/3	Lucknow
FLANAGAN, James C. Del Mar Coll., Corpus Christi, Texas	Automobile Engr. (Polytech)	5/26-7/20	Chandigarh

Name	Field/Level	Dates	Place Assigned
FLETCHER, William H. Broad Ripple H.S., Indianapolis, Ind.	Chemistry/School	5/12-7/4	Waltair
FONTANA, Peter R. Oregon State Univ.	Physics/College	5/5-7/3	Pilani
FORDMAN, Seymour B. New York City Comm. Coll., Brooklyn, N.Y.	Construction Tech. (Polytech)	5/29-7/26	Hyderabad
FRY, Wayne L. NSF/Washington	General Supervisor	4/14-5/29	Various Places
FULLER, John L. The Jackson Lab., Bar Harbor, Me.	Biology	4/21-6/7	Various Places
GARDNER, Marjorie H. Univ. of Maryland	Chemistry/School	5/10-6/14	Bhubaneswar
GERSTLE, Kurt H. Univ. of Colorado	Structural Engr.	5/13-6/13	Coimbatore
GOBSME, Frank B. Bettendorf Comm. School, Bettendorf, Iowa	Chemistry/School	5/8-6/30	Ajmer
GREEN, Morris Hunter Coll. of City Univ. of N.Y.	Biology/College	4/28-7/12	Jaipur
GULLED, Orville J. Brookfield Central H.S., Brookfield, Wis.	Biology/School	5/13-7/10	Agra
GUNTER, Roy C., Jr. Coll. of the Holy Cross, Worcester, Mass.	Physics/School	4/28-6/19	Annamalainagar
GURFINKEL, German R. Univ. of Illinois	Structure Tech. (Polytech)	5/27-7/17	Bangalore
HAGEIS, Alex J. Reed Coll., Portland, Ore.	Biology/College	5/19-7/12	Chandigarh
HALL, Lyle C. Wis. State Univ., River Falls, Wis.	Chemistry/College	4/22-6/15	Nagpur
HARP, Milton E. Purdue Univ.	Soil Mechanics (Engr.)	5/4-6/9	Roorkee
HARRISON, Anna J. Mount Holyoke Coll.	Chemistry/College	5/5-7/3	Varanasi
HAYASHI, Toru Illinois Inst. of Tech.	Biology	5/5-6/12	Various Places

Name	Field/Level	Dates	Place Assigned
HEADLEE, Elmer W. Kirkwood H.S., Kirkwood, Mo.	Chemistry/School	5/31-7/21	Chandigarh
HEMPLING, Harold G. Cornell Univ. Medical Coll.	Biology/College	5/5-6/28	Kolhapur
HEUER, Gerald A. Concordia Coll., Moorhead, Minn.	Mathematics/School	4/24-6/21	Poona & Allahabad
HIGGERSON, Charles A. Mohawk Valley Comm. Coll., Utica, N.Y.	Machine Shop Tech. (Polytech)	5/19-7/15	Bhopal
HILDEBRAND, James L. W. Wash. State Coll., Bellingham, Wash.	Mathematics/School	4/19-6/14	Bangalore
HOLTON, Gerald J. Harvard Univ.	Physics	5/7-6/17	Udaipur
HOOGSTOEL, Robert E. Broome Tech. Comm. Coll., Binghamton, N.Y.	A.C. & Refrigeration (Polytech)	5/20-7/10	Allahabad
HOPKINS, Harold H. St. Cloud State Coll., St. Cloud, Minn.	Biology/School	5/5-6/26	Hyderabad
HORWITZ, Henry E. Dutchess Comm. Coll., Poughkeepsie, N.Y.	Mechanical Engr. (Polytech)	5/27-8/9	Madras
HUBBARD, John C. F.J. Reitz H.S., Evansville, Ind.	Chemistry/School	5/5-6/28	Annamalainagar
HUDAHL, Wally I. Homestead H.S., Mequon, Wis.	Chemistry/School	5/6-6/26	Hyderabad
HUNTINGTON, Hillard H. Rensselaer Polytechnic Inst.	Physics	12/30/68- 1/18/69	Various Places
HUTTON, Wilbert Jr. Bowling Green State Univ.	Chemistry/School	5/5-6/28	Indore
ILLINGER, Karl H. Tufts Univ.	Chemistry/College	5/8-6/26	Cuttack
IWASH, Eugene V. Univ. of Texas	Physics/College	4/26-6/19	Baroda
JASTRAM, Phillip S. Ohio State Univ.	Physics	4/22-7/11	Various Places

Name	Field/Level	Dates	Place Assigned
JENSEN, Berlin C. Roy H.S., Roy, Utah	Biology/School	5/5-6/28	Hyderabad
JENSEN, James LaMont Roy H.S., Roy, Utah	Biology/School	4/14-6/26	Annamalainagar
JOHNSON, Ellis L. Yale Univ.	Mathematics/College	4/24-7/6	Delhi & Bhopal
JOHNSON, Gregory F. Ulster County Comm. Coll., Stone Ridge, N.Y.	Industrial Electronics (Polytech)	5/27-7/19	Madras
JONES, F. Burton Univ. of Cal., Riverside	Mathematics (Polytech)	10/3-10/21	Various Places
KAUFMAN, Ernest D. St. Mary's Coll., Winona, Minn.	Chemistry/College	5/5-6/26	Chandigarh
KEISER, John W. Univ. of Arkansas	Mathematics/College	5/5-6/30	Meerut
KELLER, Henry P. The Peddie School, Hightstown, N.J.	Physics/School	5/24-7/10	Chandigarh
KILMER, Henry J. Rex Putnam H.S., Milwaukie, Ore.	Biology/School	5/19-7/19	Ranchi
KING, L. Carroll Northwestern Univ.	Chemistry	5/19-6/14	Various Places
KNUDSEN, John R. New York Univ.	Mathematics/School	4/21-6/14	Bangalore
KUSTH, Rudolf Georgia Inst. of Tech.	Mathematics/College	4/21-6/14	Baroda
KUSIC, George L., Jr. Univ. of Pittsburg	Electrical Eng.	4/22-6/16	Baroda
LAMBERT, Francis L. Union Coll., Schenectady, N.Y.	Biology/College	5/5-6/28	Kolhapur
LAMPERT, Henry A., Jr. Lamar State Coll. of Tech., Beaumont, Texas	Polytechnic	5/19-7/31	Various Places
LARSEN, Max D. Univ. of Nebraska	Mathematics/School	5/6-7/1	Kurukshetra

Name	Field/Level	Dates	Place Assigned
LARSON, Maurice A. Iowa State Univ.	Chemical Engg.	4/24-7/3	Kharagpur
LAWRENCE, Willard E. Marquette Univ.	Mathematics/College	5/13-7/5	Tirupati
LEARNARD, Everett F. Milton Acad., Milton, Mass.	Physics/School	4/28-6/19	Annamalainagar
LILLIS, James C. Lowell Tech. Inst., Lowell, Mass.	Industrial Engg. (Polytech)	5/19-7/10	Allahabad
LINDSLAD, James G. Lowell H.S., Whittier, Cal.	Physics	6/7-7/12	Udaipur
MAJOR, John K. Univ. of Cincinnati	Physics/School	4/24-6/12	Vallabh Vidyanagar
MARRAM, Mary J. St. Joseph Coll., W. Hartford, Conn.	Mathematics/School	5/15-7/4	Delhi
MARSH, Robert J. Univ. of Illinois	Physics/College	5/15-7/5	Delhi
McCARTHY, David F. Mohawk Valley Comm. Coll., Utica, N.Y.	Construction Tech. (Polytech)	5/12-7/10	Bhopal
McKIE, James K., Jr. Iowa State Univ.	Construction Engg. (Polytech)	5/26-7/21	Chandigarh
MEMICSON, Ancel C. Univ. of North Carolina	Mathematics/School	5/5-7/3	Calcutta
MILLER, Bruce L. Flint Comm. Coll., Flint, Mich.	Industrial Electronics	5/27-7/17	Chandigarh
MITCHELL, Robert I. Univ. of Dayton	Industrial Engg.	4/28-7/7	Bhopal & Ahmedabad
MORRIS, Joseph B. Howard Univ.	Chemistry/School	5/12-7/5	Lucknow
MOSLEY, John A. Keene State Coll., Keene, N.H.	Mathematics/School	5/20-7/3	Kanpur
MULLINS, Robert T. Marquette Univ.	Mathematics/School	5/13-7/3	Jaipur

Name	Field/Level	Dates	Place Assigned
NARENDRA, Kumpati S. Yale Univ.	Digital Computation & Control (Eng.)	5/20-7/14	Hyderabad
NELSON, Rex S. Occidental Coll., Los Angeles, Cal.	Physics/College	6/9-8/1	Gauhati
NEILSON, Carl E. Ohio State Univ.	Physics/College	5/12-7/28	Nagpur
O'CONNOR, Paul R. Univ. of Minnesota	Chemistry	3/29-6/14	Various Places
OINES, Ole P.J. Glenbrook N. H.S., Northbrook, Ill.	Physics/School	4/28-6/19	Ahmedabad
OSMUN, Elizabeth M. Univ. of Iowa	Chemistry/College	4/21-6/7	Delhi
OVERMIRE, Thomas G. CUEBE	Biology/School	4/28-6/22	Madras
PACHER, Lester Univ. of Cal., Berkeley	Biology/College	5/26-7/15	Sagar
PAISNER, Samuel New York Univ.	Mathematics/College	5/20-7/12	Lucknow
PEACOCK, Ian M. Wauwatosa Public School, Wauwatosa, Wis.	Physics/School	5/6-6/27	Kolhapur
PERISSINI, Anthony L. Univ. of Illinois	Mathematics/College	5/12-7/3	Jaipur
PETERSON, Gary D. Pacific Lutheran Univ.	Mathematics	10/13/68- 1/25/69	Various Places
PINRICH, Merry T. Univ. of Akron	Physics/College	4/27-6/21	Sagar
POTTER, Lorna D. Univ. of New Mexico	Biology/College	5/5-6/26	Varanasi
PRATT, Charles Savannah State Coll., Savannah, Ga.	Chemistry/School	4/21-6/12	Bangalore

Name	Field/Level	Dates	Place Assigned
PAVLIK, William J. Brookfield Central H.S., Brookfield, Wis.	Chemistry/School	4/21-6/12	Indore
PEIL, Herbert C. Univ. of Cincinnati	Civil Eng.	4/29-7/4	Roorkee
PATT, Donald D. Bloomsburg State Coll., Bloomsburg, Pa.	Biology/School	5/26-7/19	Delhi
PRESLIPN, John F. Univ. of Rochester	Mathematics/College	5/5-6/30	Meerut
RAW, Isias Univ. of Sao Paulo, Brazil	Physics	9/15-10/6	Various Places
REINHART, Howard E. Univ. of Montana	Mathematics/College	4/28-6/23	Lucknow
REMO, Martin A. Heidelberg Coll.	Physics/School	4/22-6/16	Mysore
RHODES, John S. Middlebury Coll.	Physics/School	5/6-7/10	Varanasi & Udaipur
RIGGS, Charles L. Texas Tech. Coll.	Mathematics/School	5/5-7/5	Calcutta
ROONEY, Victor M. Univ. of Dayton	Industrial Electronics	5/6-6/12	Allahabad
ROTHWEN, Noel J. Univ. of Illinois	Mathematics/College	5/4-7/1	Madurai
ROUSE, Arthur G. St. Louis Univ.	Physics/School	5/5-6/26	Calcutta
RUSSELL, Milton E. Hewlett Packard Co.	Physics	10/28-11/23	Delhi
SACHS, David Lehman Comm. Coll., Bronx, N.Y.	Physics/School	4/26-6/21	Bangalore
SCHLIGER, Jeanne d'Arc (Sister) Antioch Coll.	Biology/School	4/7-6/17	Aurangabad

Name	Field/Level	Dates	Place Assigned
SCHREIER, Robert M. Univ. of Nebraska	Mathematics	5/5-7/7	Various Places
SCOTT, James J. Interlake H.S., Bellevue, Wash.	Physics/School	5/5-6/28	Kolhapur
SPANKUS, Adolf A. Canonsville Coll.	Biology/School	4/17-6/12	Bangalore
SPIELL, Jackson F. Cypress Jr. Coll., Cypress, Cal.	Chemistry/School	4/21-6/14	Bangalore
STEPHENS, Grover C. Univ. of California, Irvine	Biology/College	4/21-6/26	Ahmedabad
STERLING, Daniel J. Bowdoin Coll.	Mathematics/College	5/6-6/30	Jabalpur
STIEG, Kurt M. National Bureau of Standards	Chemistry/College	4/21-6/12	Nagpur
STONE, Marshall Univ. of Massachusetts	Mathematics	12/8/68- 2/10/69	Various Places
STRICKLIN, Thomas D. Berea Coll., Berea, Ky.	Physics/College	5/6-6/26	Calcutta
STUDEBAKER, Harwell P. Western Maryland Coll.	Biology/School	4/28-7/3	Bhubaneswar
SWARTZ, Charles E. Union Coll.	Physics/School	4/14-6/10	Alwaye
TAMBES, Milton Univ. of Michigan	Chemistry/College	4/28-6/12	Mysore
TAYLOR, Maggie D. Howard Univ.	Chemistry/College	5/6-6/26	Chandigarh
TOMLES, Averett S. Clemson Univ.	Biology/College	4/12-6/5	Mysore
TOMPKINS, Robert N. Univ. of Nevada	Mathematics/College	5/6-6/29	Jodhpur

Name	Field/Level	Dates	Place Assigned
TRIPP, Arley L. City Coll. of San Francisco	Industrial Electronics (Polytech)	5/31-7/21	Bangalore
TULECKE, Walter R. Antioch Coll.	Biology	4/13-6/16	Various Places
UMBREIT, Wayne W. Rutgers Univ.	Biology	5/19-7/17	Various Places
WANCE, John D. Gaston Coll., Gastonia, N.C.	Construction Tech. (Polytech)	5/5-7/3	Ahmedabad
VAN DYCKE, Henry Univ. of Wisconsin	Mathematics	6/8-7/1	Various Places
VAN NORMAN, Richard W. Univ. of Utah	Biology/School	4/21-6/19	Ahmedabad
VOGELY, Barry D. Mount Union Coll., Alliance, Ohio	Mathematics/School	4/12-6/23	Madras
WATSON, Joseph T. (Rev.) Brooklyn Prep. School, Brooklyn, N.Y.	Physics/School	5/6-6/26	Waltair
WATSICK, Arthur M. Penn. State Univ.	Physics/College	5/5-6/19	Waltair
WHEELER, Charles M. Univ. of New Hampshire	Chemistry/School	5/26-7/18	Chandigarh
WHITE, Edward P. Univ. of Cincinnati	Engineering	5/5-7/7	Various Places
WHITNEY, Richard M. Roxbury Latin School, Boston, Mass.	Chemistry/School	5/12-7/10	Patna
WILSON, Dale G. Purdue Univ.	Industrial Engr. (Polytech)	5/31-7/19	Bangalore
YOUNG, Frederick H. Oregon State Univ.	Mathematics/College	4/14-6/5	Trivandrum
YOUNGBLOOD, Ralph F. Georgia Inst. of Tech.	Polytechnic	6/7-8/14	Various Places

Short Term Consultants (130) CY-1969

Name	Field/Level	Dates	Place Assigned
ALBERA, Hubert N. Princeton Univ.	Chemistry	11/30/69- 1/9/70	Various Places
ANDERSON, Jack M. Univ. of Iowa	Mathematics/School	5/5-7/4	Cuttack
ANDERSON, Paul M. Iowa State Univ.	Engineering	5/25-7/1	Kharagpur
ASCHER, Samuel Henry Ford H.S., Detroit, Mich.	Chemistry/School	5/4-6/25	Indore
ASIMOW, Morris Univ. of Cal., Los Angeles	Engineering	11/15-12/25	Delhi
BECKER, Jerry F. Rutgers Univ.	Mathematics	1/22-7/6	Various Places
BENADE, Arthur H. Case Western Reserve Univ.	Physics/School	5/21-7/14	Allahabad
BILBROUGH, Glenn-Myron Swarthmore Coll.	Physics/School	4/27-5/30	Kolhapur
BOEHLEIRE, Irving F. Chico State Coll., Chico, Cal.	Physics/College	5/12-7/2	Gorakhpur
BOYATLAN, Richard J. Univ. of Chicago, Lab. H.S.	Biology/School	4/6-7/9	Alwaye
BRANSON, Luke K. Montana Coll. of Mineral Sci. & Tech.	Physics/School	4/23-6/15	Mysore
BRENNAN, John W. George Washington H.S., Denver, Col.	Biology/School	4/20-6/11	Poona
BROCKENBROUGH, Richard F. Phillips Exeter Acad., Exeter, N.H.	Physics/College	4/23-6/15	Mysore
BRODSKY, Stanley M. New York City Comm. Coll., Brooklyn, N.Y.	Polytechnic	5/28-7/15	Bhopal
BROWN, Fayette J. Chico State Coll., Chico, Cal.	Polytechnic	5/25-7/2	Calcutta

Name	Field/Level	Dates	Place Assigned
BROWN, Frederick C. Univ. of Illinois	Physics	12/30/68- 1/18/69	Various Places
CASSIDY, Harold G. Yale Univ.	Chemistry/College	4/29-6/19	Madurai
CHESLEY, Robert E. The Thacher School, Ojai, Cal.	Physics/College	5/4-6/25	Delhi
CHOATE, David C. Ohio Coll. of Applied Sci., Cincinnati, Ohio	Polytechnic	5/25-7/16	Jadavpur
COBURN, Maurice M. New Mexico State Univ., Las Cruces, N.M.	Physics/School	4/14-6/6	Trichinapally
COHEN, Maskell Univ. of Mass.	Mathematics/College	5/14-7/2	Kanpur
COMSTOCK, Dale R. Central Washington State Coll.	Mathematics/College	5/5-6/25	Tirupati
COSTLOW, John D., Jr. Duke Univ. Marine Lab.	Biology/College	4/26-5/21	Ernakulam
COWAN, Clifford W. Southern Tech. Inst., Marietta, Ga.	Polytechnic	5/25-7/16	
CRESSMAN, Harriet B. Wellesley Coll.	Biology/College	6/8-8/3	Allahabad
DAUGHER, Gilbert M. Concordia Teachers Coll., Seward, Neb.	Physics/School	5/4-6/27	Jodhpur
DALPHIN, Richard J. Univ. of Hartford	Polytechnic	5/16-7/16	Allahabad
DART, S. Leonard Claremont Coll.	Physics	4/18-7/13	Various Places
DAVIDSON, Bruce R. Washington State Univ.	Engineering	4/28-7/4	Roorkee
DAW, Harold A. New Mexico State Univ.	Physics	5/23-6/14	Various Places
DAXTER, Irving E. Montana State Univ.	Physics/College	5/11-7/2	Madurai
DEMACHIS, Henry T. Fordham Univ.	Mathematics/School	5/4-6/30	Gwalior

Name	Field/Level	Dates	Place Assigned
DeMOTT, James V. Marple Newtown Schools, Newton Square, Pa.	Physics/School	5/30-6/28	Delhi
DEITENBEITER, A. James Lehigh Univ.	Chemistry	4/19-7/9	Various Places
DELL, Norman M. Delaware State Coll., Dover, Del.	Biology/School	5/5-6/27	Muzaffarnagar
DEIER, John T., Jr. Mohawk Valley Comm. Coll., Utica, N.Y.	Polytechnic	6/4-7/18	Madras
DOUGLAS, Roy Univ. of Washington	Mathematics/School	4/20-6/13	Aligarh
EDWARDS, Wayne C. Oklahoma State Univ.	Engineering	5/11-6/17	Madras
EDWARDS, Hans Albert Univ. of Cal.	Engineering	5/12-6/1	Roorkee
EL-WAKIL, Mohamed M. Univ. of Wisconsin	Engineering	5/18-7/2	Howrah
ENGELHARDT, Richard K. Univ. of Illinois	Engineering	4/27-6/8	Kanpur
EVERT, Carl F., Jr. Univ. of Cincinnati	Engineering	6/9-7/15	New Delhi
FAN, H.Y. Purdue Univ.	Physics	12/30/68- 1/18/69	Various Places
FARRER, Joseph M. Univ. of Dayton	Polytechnic	5/4-7/11	Ahmedabad
FEHR, Howard F. Teachers Coll., Columbia Univ.	Mathematics/School	4/20-6/4	Madras
FEINSTEIN, William J. Univ. of Wisconsin	Engineering	4/27-7/2	Madras
FIRESTONE, Seymour R. New York City Comm. Coll., Brooklyn, N.Y.	Polytechnic	5/28-7/27	Chandigarh
FREIDAN, Sheldon Euclid H.S., Euclid, Ohio	Biology/School	4/23-6/15	Bombay

Name	Field/Level	Dates	Place Assigned
GAUCHER, Marjorie M. Univ. of Maryland	Earth Science/School	4/27-6/14	Bangalore
GEAR, Charles W. Univ. of Illinois	Engineering	5/11-6/15	New Delhi
GERSTLE, Walter H. Univ. of Colorado	Engineering	5/21-6/25	Coimbatore
GLANTZ, Irwin E. Albany State Coll.	Mathematics/School	4/24-6/20	Ahmedabad
GOLDHEF, Ronald B. Tufts Univ.	Engineering	5/4-6/10	Baroda
GOSTINGER, Gaston P. Univ. of Illinois	Polytechnic	5/26-7/15	Jabalpur
GRIFFITH, Robert E. Purdue Univ.	Engineering	5/25-6/27	Coimbatore
HAIGHTONE, Marcus A. U.S. Commission for Cultural Exchange with Iran	Biology/College	5/3-7/2	Cuttack
HANCOCK, John C. Purdue Univ.	Engineering	5/4-6/30	New Delhi
HEAGE, R. Frank Southern Tech. Inst., Marietta, Ga.	Polytechnic	6/1-7/16	Chandigarh
HELEX, Gerald A. Concordia Coll., Moorhead, Minn.	Mathematics/College	5/4-7/2	Gorakhpur
HOCHSTEIN, Charles J. Mohawk Valley Comm. Coll., Utica, N.Y.	Polytechnic	5/25-7/20	Shogal
HOISCH, Lester M. California State Coll., Los Angeles, Cal.	Physics/School	5/4-6/25	Raipur
HOWATT, Henry E. Dutchess Comm. Coll., Poughkeepsie, N.Y.	Polytechnic	5/26-7/15	Madras
HUNTINGTON, Hilland B. Rensselaer Polytechnic Inst.	Physics	12/30/68- 1/19/69	Various Places
JACKSON, Willard J. Teachers Coll., Columbia Univ.	Chemistry/School	4/29-6/15	Ajmer
JOHNSON, Gregory F. Wheler County Comm. Coll., Stone Ridge, N.Y.	Polytechnic	5/26-7/15	Bangalore

Name	Field/Level	Dates	Place Assigned
JONES, Burton W. Univ. of Colorado	Mathematics/School	6/4-7/23	Jammu
JONES, Charles E. Univ. of Arkansas	Physics/College	4/24-6/20	Ahmedabad
KAMEROTO, Fred I. Univ. of Hawaii	Biology	6/18-7/4	Various Places
KENNEDY, Robert M. NCAR, Boulder, Colo.	Biology	12/29/69- 1/24/70	Madurai
KINCELAS, John E. Rowlee H.S., Concord, Mass.	Physics/School	4/23-6/27	Ahmednagar
KIZER, Henry J., Jr. Rue Pulman H.S., Milwaukie	Biology/School	5/11-7/30	Guntur
LEACH, James L. Univ. of Illinois	Polytechnic	5/5-6/25	Ahmedabad
LACHOIETTE, Brenda M. Col. Inst. of Tech.	Engineering	6/20-7/25	Kurnur & Pilani
LEWIS, Robert D.	Biology	11/10-12/10	Madras
MAC RAE, William R. Sir F. Drake H.S., San Rafael, Cal.	Chemistry/School	5/14-7/18	Agra
MANCHLICKAR, Paul C. Swarthmore Coll.	Physics/College	5/11-7/4	Kanpur
MARTIN, John R. Univ. of Houston	Polytechnic	6/3-7/17	Bangalore
McCLEND, Leland T. Indiana Univ.	Biology	5/12-6/13	Various Places
McCURDY, Patrick A. Univ. of Notre Dame	Chemistry/College	5/16-6/13	Bombay
MONCE, Edward R. Univ. of Illinois	Physics/College	6/27-8/16	Bombay
MILLER, Jack C. Pomona Coll.	Physics/College	5/4-6/25	Delhi

Name	Field/Level	Dates	Place Assigned
MILTON, Theodore E. Alexander Ramsey Sr. H.S., St. Paul, Minn.	Chemistry/School	4/27-7/2	Jodhpur
MORRIS, Joseph H. Howard Univ.	Chemistry/College	5/4-6/25	Udaipur
NELSON, L. Warren Highland Park Board of Ed., Detroit, Mich.	Ele. Science	11/30/68- 1/2/70	Bombay
OATES, William R. Univ. of Arkansas	Mathematics	5/5-6/27	Various Places
PEACOCK, Ben W. Wauwatosa Public Schools, Wauwatosa, Wis.	Physics/School	4/28-6/27	Udaipur
PETERSEN, Quentin R. Simmons Coll., Boston, Mass.	Chemistry/College	5/11-7/2	Dharwar
PETERSON, Gary D. Pacific Lutheran Univ.	Mathematics	10/13/68- 1/25/69	Various Places
PRAMER, David Rutgers Univ.	Biology/College	4/27-6/4	Bombay
REISS, Lynn C. Univ. of Texas	Engineering	5/18-7/1	Bombay
REID, Karl Newville, Jr. Oklahoma State Univ.	Engineering	5/26-7/4	Coimbatore
RIDE, Merrill K. Univ. of Utah	Earth Science/School	4/27-6/14	Bangalore
RIGGS, John S. Univ. of Missouri	Physics/School	5/19-7/8	Raipur
ROE, Sheldon T. Southern Oregon Coll.	Mathematics/School	4/5-6/1	Trivandrum
ROTHERT, Miles K. Florida State Univ.	Polytechnic	6/4-8/6	Various Places
ROMBERG, Thomas A. Univ. of Wisconsin	Mathematics/School	5/21-6/20	Delhi
ROUSE, Hunter Univ. of Iowa	Engineering	1/22-2/8	Various Places
VAN PATTEN, Anthony Indiana Univ.	Biology	5/4-6/1	Various Places

Name	Field/Level	Dates	Place Assigned
SCHOOLS, James T. Univ. of Arkansas	Mathematics/College	5/5-6/25	Calcutta
SHELLHAMMER, Claire J. Brookhaven National Lab.	Biology/College	5/1-6/11	Madurai
SIMON, Ferdinand L. New York Univ.	Engineering	11/23-12/19	Delhi
SKILTON, John Fabric Research Lab., Inc., Dedham, Mass.	Engineering	5/14-6/15	Delhi
STEELE, Stephen C. Broome Technical Comm. Coll., Binghamton, N.Y.	Polytechnic	6/15-7/29	Various Places
STEIN, Jacob Univ. of Illinois	Polytechnic	5/18-7/19	Coimbatore & Allahabad
STONE, Marshall Univ. of Mass.	Mathematics	12/6/68-2/10/69	Various Places
STEWART, Albert D. Jackson Coll.	Physics/College	4/25-6/15	Mysore
STOLLENWERK, Robert J. San Francisco State Coll.	Physics/School	5/30-6/28	Delhi
STRUCHENEMEYER, Arnold A. St. Univ. of New York	Physics	10/20-10/26	Delhi
SUCHEWICZ, Stanley G. Kansas State Coll.	Chemistry/School	4/20-6/7	Amravati
TAYLOR, Charles E. Univ. of Illinois	Engineering	5/21-7/2	Kanpur
TERRY, Harry A. Metropolitan State Coll., Denver, Col.	Polytechnic	6/1-7/23	Jadavpur
TRUCK, Wolfgang J. Univ. of Colorado	Mathematics/College	5/12-7/2	Aligarh
TRUMBOUR, Susan F. Montgomery Jr. Coll., Rockville, Md.	Chemistry/School	5/24-7/2	Allahabad
TURNER, Garrit H. Purdue Univ.	Engineering	5/26-7/2	Bombay

Name	Field/Level	Dates	Place Assigned
TORRES, Annette S. Clemson Univ.	Biology/College	4/27-4/30	Ahmedabad & Sagar
TRCKA, J. Kenneth Univ. of Redlands	Physics/School	5/5-6/25	Bhagalpur
TRIECHE, Walter Antioch Coll.	Biology	4/9-6/25	Various Places
WANCE, J. David Gaston Coll., Gastonia, N.C.	Polytechnic	4/28-6/17	Poona
VAN NORMAN, Richard W. Univ. of Utah	Biology/School	5/4-6/27	Raipur
VAN VLACK, Lawrence H. Univ. of Michigan	Engineering	5/4-6/4	Kanpur
WILKINSON, Annette S. Rice Univ.	Engineering	5/12-7/1	Bombay
WOODED, Raymond M., Jr. ITT, Corp., West Palm Beach, Fla.	Engineering	4/26-5/29	Pilani
WHEELER, Charles M., Jr. Univ. of New Hampshire	Chemistry/School	4/11-6/6	Trivandrum
WHITE, Edward F. Univ. of Cincinnati	Engineering	3/31-7/30	Various Places
WINSLOW, Isaac Univ. of Chicago	Mathematics/School	4/20-6/25	Bangalore & Delhi
WOOD, Andrew L. Seattle Univ.	Mathematics/College	4/26-6/19	Aurangabad
YOUNG, Frederick M. Oregon State Univ.	Mathematics/School	4/20-6/11	Poona
YOUNG, Jay A. Kimr's College	Chemistry/School	4/27-6/25	Jabalpur
YOUNGBLOOD, Ralph P. Southern Tech. Inst., Marietta, Ga.	Polytechnic	5/7-7/20	Various Places
YOUNGER, Philip G. St. Cloud State Coll., St. Cloud, Minn.	Physics/School	4/9-5/30	Always

Short Term Consultants (NS) CY-1970

Name	Field/Level	Dates	Place Assigned
ALLEN, John S. Univ. of Utah	Mathematics/School	4/27-6/13	Delhi
ALSTA, Robert M. Pennsylvania Univ.	Chemistry	11/30/69- 1/9/70 & 12/21/70 - 1/24/71	Various Places
ANDERSON, Theodore A. Univ. of South Florida	Chemistry	7/13-8/4	Hyderabad
AVERY, Sidney F. New York Comm. Coll., Brooklyn, N.Y.	Polytechnic	6/21-10/25	Hyderabad
WARTLE, Robert G. Univ. of Illinois	Mathematics/College	1/24-7/25	Ranchi
WATSON, Jay II West Virginia Univ.	Biology/College	1/24-7/25	Ujjain
BEACHY, John A. Grahm Coll., Grahm, Ind.	Mathematics/School	1/4-7/24	Tambaipur
BECKER, Jerry P. Nebraska Univ.	Mathematics	1/4-4/20	Various Places
BEDIENT, Phillip T. Franklin & Marshall Coll.	Mathematics/School	6/1-7/24	Gauhati
BECKER, Phillip R. Marquette Univ.	Mathematics/School	1/[illegible]/27	Amritsar
BOHEN, Gerald J. Northwest N.S.	Physics/School	1/6-4/28	Indore
BROWN, Lane T. Montana Coll. of Min. Sci. & Tech.	Physics/School	4/24-6/20	Mysore
BUSS, Arthur R. Cornell Univ.	Engineering	4/19-7/12	Coimbatore & Bombay
CAMPBELL, Robert C. Highland Park H.S., Highland Park, Ill.	Chemistry/School	4/27-6/17	Madras
CHAFFEE, David E. Newlett-Packard Co.	Physics	7/27-8/13	Delhi

Name	Field/Level	Dates	Place Assigned
CHAPPE, Lowell F. Auburn Univ.	Military	4/15-7/29	Bangalore
CONNELL, McGeorge Univ. of Colorado	Physics/College	5/15-6/14	Jaipur
CRAFT, Joel Queens Borough Comm. Coll., Queens, N.Y.	Polytechnic	5/16-7/17	Bombay
CRESWELL, Clifford James Hamline Univ., St. Paul, Minn.	Chemistry/College	5/3-7/2	Bombay & Aurangabad
CROSSNOHER, John F. Mansfield City School	Elm. Science	6/17-8/14	Bombay
DAVY, E. Lawrence Pitzer Coll. and Scripps Coll., Claremont, Cal.	Physics/College	5/6-7/1	Dibrugarh
DEILE, Donald W. Unified School Dist. Rancho Mirage, Cal.	Elm. Science	4/4-7/5	Bombay
DIETTERBERTS, A. James Lehigh Univ.	Chemistry	5/31-7/24	Various Places
DUMBAUGH, Lowell C. Cleveland State Univ., Cleveland, Ohio	Engineering	5/24-7/3	Madras
DUNN, Donald J. Oklahoma Christian Coll., Oklahoma City, Ok.	Military/School	4/12-7/5	Poona & Ajmer
EKROT, Ian G. Montana State Univ.	Engineering	4/12-7/25	Various Places
ELLED, Norman Southern Tech. Inst., Marietta, Ga.	Polytechnic	5/24-7/26	Various Places
FAYLOR, Richard V., Jr. Tilton School, Tilton, N.H.	Physics/School	4/27-7/1	Kolhapur
FEINBERG, Charles Univ. of Minnesota	Engineering	5/13-6/11	Kurukshetra
FONTANA, Peter F. Oregon State Univ.	Physics	5/5-7/3	Various Places

Name	Field/Level	Dates	Place Assigned
[illegible], Andrew J. Northern Washington State Coll.	Chemistry/College	6/1-7/9	Juneau & Sagar
[illegible], Jacob Harvey Mudd Coll.	[illegible]	6/22-8/2	Various Places
[illegible], Edgar T. Southern Tech. Inst.	Polymerchem	6/6-7/2	Various Places
[illegible], Murray Mack Harvey Mudd Coll.	Engineering	6/22-7/2	Delhi
[illegible], Robert C. North N.J., Shabbyman, Vis.	Chemistry/School	6/27-7/8	Gaubert
[illegible], J.S. Kansas State Coll.	Mathematics/School	6/1-6/23	Sadgar
[illegible], A. Frank Southern Tech. Inst.	Polymerchem	6/26-7/31	Ramchd & Poona
[illegible], Wardlaw R. Univ. of Col.	Engineering	6/22-7/2	Delhi
[illegible], Charles A. Mohawk Valley Comm. Coll., Utica, N.Y.	Polymerchem	6/22-8/2 & 12/20-12/31	Thomal
[illegible], G. Ross Oregon Tech. Inst.	Polymerchem	6/4-7/24	Various Places
[illegible], Nancy E. Onondaga Comm. Coll., Fayetteville, N.Y.	Polymerchem	6/7-8/28	Madras
[illegible], Gregory F. Clarion County Comm. Coll., Tarpa Ridge, N.Y.	Polymerchem	6/25-7/31	Mathrad & Patna
[illegible], Russell A., Jr. Gaston Coll., Gastonia, N.C.	Polymerchem	6/22-7/2	Trivandrum
[illegible], Thomas E. Green Washington H.S., Denver, Col.	Physics/School	6/26-8/24	Poona
[illegible], John W. Univ. of Arkansas	Mathematics/School	6/27-7/4	Allahabad

Name	Field/Level	Dates	Place Assigned
KONDRY, Marvin MIT, Boston, Ch.I.	Biology	12/26/65-1/24/70	Bombay
KOURI, Harry J., Jr. New Jersey M.I., Milwaukee, Ore.	Biology	4/12-4/19	Various Places
KROOT, Sundaram A. Univ. of South. Cal.	Engineering	1/7-7/19	Kanpur
KRUGMAN, Jerome I. Cincinnati Tech. Inst.	Polytechnic	4/26-4/28	Bombay
LAMBIN, John T. Georgetown Univ.	Mathematics/School	1/4-4/24	Delhi
LAGEMANN, J.J. Univ. of Texas	Chemistry/College	1/7-4/15	Patna & Sagar
LARSEN, Miss Jane Northport Sr. & Jr. H.S.	Sci. Science	4/17-10/14	Bombay
LARSEN, Orville H. Purdue Univ.	Polytechnic	4/1-7/1	Allahabad & Kanpur
LARSON, Robert D. Argonne National Lab.	Physics/College	4/26-1/24	Chandigarh
LEGGE, Myron Univ. of Michigan	Biology	7/1-8/1	Bangalore
LEWIS, Jack L. Southern California State Coll.	Polytechnic	1/24-7/1	Bangalore
MAYER, Walter W. Univ. of Cal., Riverside	Biology/College	1/3-7/1	Madras
MCCLURE, Leland T. Indiana Univ.	Biology	1/11-4/13	Various Places
MCMILLAN, Robert D. Oklahoma Christian Coll., Oklahoma City, Ok.	Mathematics/School	4/[illegible]-4/7	Bombay
MEDNICK, Harry F. Rensselaer Polytechnic Inst.	Physics	4/12-4/24	Delhi & Jabalpur

Name	Field/Level	Dates	Place Assigned
MCDONNELL, Robert V. Ohio Wesleyan Univ.	Mathematics/Colleges	1/22-7/21	Rochester
MENDIN, Francis C. Iowa City Univ.	Engineering	5/21-6/28	Delhi
MILLER, Bruce L. Pilot Chem. Coll.	Polymerchem	4/22-7/12	Trenton & Nagpur
MONTGOMERY, Ralph C. Univ. of Tennessee	Physics/Colleges	5/3-6/24	Jammu
MITCHELL, Robert I. Univ. of Dayton	Polymerchem	5/22-7/10	Thrissur
MORGAN, Henry W. Oak Ridge National Lab.	Chemistry/Colleges	5/24-7/3	Chandigarh
MOLZAN, Howard A. Wheaton Coll.	Chemistry/Colleges	5/21-6/22	Calcutta
MOLZAN, L. Warren Highland Park Board of Ed., Detroit, Mich.	Tch. Science	12/30/49 - 2/2/70 & 7/27-8/22	Bombay
MOTTER, Richard G. Milwaukee State Univ., Oshkosh, Wis.	Tch. Science	6/2-7/30	Delhi
O'BRIEN, Robert J. Southwest Minnesota State Coll.	Polymerchem	5/25-7/4	Chandigarh
PARKER, Lester Univ. of Cal.	Biology/Colleges	5/3-6/23 & 8/21-8/23	Madurai & Madras
PALEY, Lester G. State Univ. of New York, Stony Brook, N.Y.	Physics/Schools	6/24-6/27	Bombay
PETERSON, Gordon E. Lawrence Hall of Science	Tch. Science	6/2-8/5	Delhi
POOL, Norbert C. Univ. of Cincinnati	Engineering	5/29-7/3	Madras
WARNER, J.W. Purdue Univ.	Physics/Colleges	6/24-6/29	Mysore

Name	Field/Level	Dates	Place Assigned
REID, R.H., Jr. Oklahoma State Univ.	Ent/Undergr	5/4-6/5	Coldwater
KELLY, William F. Iowa State Univ.	Ent/Undergr	5/24-7/1	Harper
WELTON, John L. Claremont, Cal.	Earth Sciences/Colleges	5/3-6/12	Hennessey
SCOTT, William F. Univ. of Utah	Mathematics/Colleges	5/21-7/1	Sayre
STALL, Robert E. Oberlin Coll.	Mathematics/Schools	5/24-7/4	Prescilla
KALLENBERGER, Robert A. Metropolitan State Coll., Denver, Col.	Phys/Tech/Prac	5/22-7/19	Delta
HILTON, M. Nelson Mount St. Scholastica Coll., Atchison, Ks.	Mathematics/Schools	6/26-8/19	Aurora/Bond
[illegible], Martin E. Tufts Univ.	Ent/Undergr	5/23-7/9	Khrenburger
[illegible], James W. General Motors Inst., Flint, Mich.	Phys/Tech/Prac	5/14-6/24	Coldwater
[illegible], Vincent D. Brooklyn Center H.S., Brooklyn Center, Minn.	Chem/Astro/Schools	6/27-8/16	Thrapel
[illegible], Neil S. Commerce Middle Univ.	Physics/Colleges	6/26-7/12	Rockwood & Mancos
[illegible], Charles E. West Virginia Univ.	Ent/Undergr	7/1-8/12	Kenyon
[illegible], Joseph T. Brooklyn Prep. School, Brooklyn, N.Y.	Physics/Schools	5/31-7/7	Gunter
[illegible], Thomas T. Harvey Mudd Coll.	Ent/Undergr	5/21-7/1	Delta
[illegible], Charles E. Nova Univ. Phys. Sciences Center, Ft. Lauderdale, Fla.	Biology/Colleges	6/25-8/5	Brookston

Short Term Consultants (ST) (9-1971)

Name	Field/Level	Dates	Place Assigned
[illegible], Robert M. Princeton Univ.	Chemistry	12/22/71- 1/24/72	Sombay
[illegible], Sidney M. N.Y. City Comm. Coll., Brooklyn, N.Y.	Polymerchemic	4/22-4/26	Hyderabad
[illegible], Francis E. NCCT, Berkeley, Cal.	Biology	1/3-4/17	Secunderabad, Bangalore
[illegible], Robert Columbia Univ.	Mathematics	4/24-4/26	Madurai
[illegible], George C. Stanford Research Institute	Chemistry	12/3-12/22	Various Places
[illegible], Robert A. Cal. Inst. of Tech.	Chemistry	3/17-12/22	Bombay, Poona
[illegible], Lane M. Montana Coll. of Min. Sci. & Tech.	Physics	1/1-7/29 & 8/27-12/22	Mysore
[illegible], Jerry Oak Ridge National Lab.	Chemistry	[illegible]	Delhi
[illegible], Donald M. Tulsa Public Schools, Tulsa, Okla.	Mathematics	2/21-3/24	Bombay
[illegible], R.E. Case Western Reserve Univ.	Physics	1/23-3/17	Mysore, Waltair
[illegible], Leslie T. Brown Univ.	Chemistry	3/4-4/30	Various Places
[illegible], George H. Univ. of Missouri	Environmental	1/24-4/12	Kurukshetra, Mysore
[illegible], Norman D. Am. Cyanamid Co., Stamford, Conn.	Chemistry	9/24-12/17	Various Places
[illegible], Thomas F. Univ. of Florida	Chemistry	2/21-3/31	Various Places
[illegible], Jon C. Wayne State Univ.	Chemistry	4/23-7/5	Poona, Madras
[illegible], A. James Lehigh Univ.	Chemistry	1/24-4/25	Kanpur

Name	Field/Level	Dates	Place Assigned
FINDMAN, Seymour D. N.Y. City Comm. Coll., Brooklyn, N.Y.	Polymerization	1/21-4/29	Hyderabad
FRANKLIN, Stanley P. Carnegie Inst. of Tech.	Mathematics	1/14-4/22	Various Places
FREDRICK, J. Bruce Univ. of Rochester	Physics	1/2-4/1	Chandigarh
GOLDSTEIN, Murray M. Harvey Mudd Coll.	Engineering	4/24-12/21	Delhi
HIGGINSON, Charles A. Mohawk Valley Comm. Coll., Utica, N.Y.	Polymerization	1/13-7/24	Bhopal
HOOK, Paul Naval Conservation Educational Services, Freeman Pkw., N.Y.	Audio-Visual	4/24-12/10	Ahmedabad
HOWITT, Harry T. Dutchess Comm. Coll., Poughkeepsie, N.Y.	Polymerization	4/11-12/24	Madras
JONES, Darrin W. Univ. of Colorado	Mathematics	1/20-7/25	Various Places
KING, L. Cornell Northwestern Univ.	Chemistry	1/4-3/7	Various Places
KOLLINGER, Peter T. Univ. of Kansas	Chemistry	1/14-4/27	Kanpur
MOLOFF, Walter H. Univ. of California	Physics	1/23-4/11	Nagpur
LARSON, Mike Jane North Park Jr. & Sr. H.S., Walden, Col.	Elm. Science	3/4-4/7	Bombay
LAWSON, Tom E. Univ. of Illinois	Polymerization	1/4-12/31	Bhopal
MAC NAU, William R. Sir F. Drake H.S., San Rafel, Cal.	Chemistry	1/1-3/4	Poona
MANZER, Harold M. Virginia Polyt. Inst.	Chemistry	3/15-3/12	Poona, Chandigarh
MEDNICK, Harry T. Rensselaer Polytechnic Institute	Physics	4/29-10/1	Delhi
MORRISON, George H. Cornell Univ.	Chemistry/Drilling	1/24-1/30	Bombay

Name	Field/Lines	Dates	Place Assigned
[illegible], Lawrence Univ. of California	Mathematics	4/22-5/29	Various Places
[illegible], George Calif. Inst. Tech.	Mathematics	10/22-12/17	Various Places
[illegible], Gordon T. Lawrence Coll of Science	Ind. Science	6/4-8/1	Somebody
[illegible], David Univ. of California	Chemistry	10/4-12/21	Mathews
[illegible], Earl L. Los Angeles Valley Jr. Coll., Cal.	Ind. Science	1/17-1/17 & 4/4-4/4	Somebody
[illegible], William W. Northern Inst., Boston, Mass.	Mathematics	1/17-12/21	Mathews
[illegible], Robert A. Univ. of Oregon	Mathematics	1/24-4/24	Detail
[illegible], William M. N.Y. City Coll., Brooklyn, N.Y.	Mathematics	1/14-7/21	Colombrano
[illegible], Thomas E. Rensselaer Polytechnic Institute	Mathematics	1/22-4/22	Mykerstad
[illegible], Robert M. Montana Nor. Sch.	Chemistry	12/5-12/22	Various Places
[illegible], Rudolf S. Northwestern Univ.	Physics	1/2-4/9	Various Places
[illegible], Paul Univ. of Illinois	Mathematics	1/21-10/21	Thrasil
[illegible], Vincent V. Univ. of Virginia	Entomology	1/11-4/21	Kumar
Van [illegible], Henry Univ. of Minnesota	Mathematics	1/14-1/31	Mount
[illegible], Charles T. West Virginia Univ.	Entomology	1/28-5/12	Mathews
[illegible], Harvey T. Univ. of California	Physics	1/23-4/2	Various Places
[illegible], Thomas J. Los Angeles Jr. Coll.	Entomology	1/27-4/6	Detail

Board Term Commitments (7) (9-197)

Name	Affiliation	Dates	Place Assigned
[illegible], Robert Col. Brat. of Tech.	Chemistry	1/1-1/31 & 4/15-6/30	Various Places
[illegible], John F. Massachusetts Coll. of Phr. Sci. & Tech.	Physics	4/1-6/4	Moscow
[illegible], Robert F. Cornell Univ.	Psychiatry	1/6-1/31	Paris
[illegible], [illegible] Board Dep. Educ. Services, Veterans Adm., N.Y.	Medicine-Mental	1/1-3/1	Stockholm
[illegible], William, Jr. Educational Testing Service	Biology	1/24-1/27	Montreal
[illegible], Max F. Univ. of Illinois	Biochemistry	1/1-3/1	Madrid
[illegible], Richard M. M.I.T.	Physics	1/15-1/30	Bangkok

APPENDIX I

DOUGLAS MACKENZIE (TO 1987)

Name	Dates of Visit
[illegible], [illegible] [illegible]	[illegible]
[illegible], [illegible] [illegible]	[illegible]
[illegible], [illegible] [illegible]	[illegible]
[illegible], [illegible] [illegible]	[illegible]
[illegible], [illegible] [illegible]	[illegible]
[illegible], [illegible] [illegible]	[illegible]
[illegible], [illegible] [illegible]	[illegible]
[illegible], [illegible] Chief Education Officer Bureau for [illegible]	[illegible]

Doubleheader Visitors (3) (76-2)

Name	Field	Dates of Visit	Planes Visited
[illegible], David Univ. of Massachusetts	Mathematics	11/5-11/7	Various Planes
[illegible], Allen R. (Mrs.) Univ. of Massachusetts	Mathematics	11/5-11/7	Various Planes

Name	Field	Dates of Visit	Places Visited
[illegible], Arthur Yale Univ.	Mathematics	1/21-3/29	Various Places
[illegible], F.D. [illegible] Yale Univ.	Mathematics	1/21-3/29	Various Places
King, L. Carroll Northwestern Univ.	Chemistry	5/6-5/9	Various Places
[illegible], William T. Univ. Notre Dame	Chemistry	6/23-5/8	Various Places
[illegible], Robert	Chemistry	12/24-11/29	
[illegible], Leonard K. Harvard Univ.	Chemistry	4/24-5/7	Various Places
[illegible], Arthur U of Washington	Chemistry	4/24-4/29	Various Places
[illegible], Milton Univ. of Michigan	Chemistry	3/24-5/4	Various Places
[illegible], Harry Stanford Univ.	Chemistry	4/24-5/4	Various Places
[illegible], Harry D. Mount Union Coll.	Mathematics	3/29-4/22	Hawaii
[illegible], Matthew R. U of Washington	Chemistry	4/24-4/29	Various Places

Invited Visitors (21) CY-1965

Name	Field	Dates of Visit	Places Visited
[illegible], Ernest Florida State Univ.	Physics	6/21-6/24	Various Places
[illegible], James A. Harvey Mudd Coll.	Chemistry	6/21-7/4	Various Places
[illegible], James S. Research Corp., New York, N.Y.	Chemistry	6/21-7/4	Various Places
[illegible], William H. Colorado State Univ.	Chemistry	6/14-7/4	Various Places
[illegible], Bruce L., Jr. Univ. of Minnesota	Chemistry	6/21-6/27	Various Places
[illegible], Paul J. New York Univ.	Chemistry	6/21-7/4	Various Places
[illegible], Harry B. Cal. Inst. of Tech.	Chemistry	6/21-7/4	Various Places
[illegible], George S. Cal. Inst. of Tech.	Chemistry	6/27-7/4	Various Places
[illegible], Donald F. Eastman Kodak Co., Rochester, N.Y.	Chemistry	6/21-6/27	Various Places
[illegible], Gordon L. NIH/Washington	Chemistry	5/25-7/14	Various Places

Technical Mission 5200 (Myers)

Name	Field	Dates of Visit	Places Visited
[illegible], Robert A. Univ. of California	Virology	11/5-11/30	Various Places
[illegible], Hungar Director Univ Ex. Tech., Hochschulen, Chair	Physics	6/15-7/3	Various Places
[illegible], Andrew Polytechnical Inst., Brooklyn, N.Y.	Physics	6/16-7/22	Various Places
[illegible], A.A. Univ Moscow Russian Univ.	Physics	6/16-7/24	Various Places
[illegible], Paul E. Santa Monica Unified School Dist., Cal.	Elec. Science	6/8-7/8	Midway
[illegible], John A. Vanderbilt Univ.	Physics	6/16-7/13	Various Places
[illegible], Norman F. Univ. Dept. of Tech.	Physics	6/25-8/24	Various Places
[illegible], Clarence J. Univ. of Cal., Santa Barbara	Virology	11/15-12/24	Various Places
[illegible], Donald Vanderbilt Univ.	Physics	6/5-8/28	Various Places
[illegible], F. Clarkson Univ. Texas Univ.	Physics	6/16-7/3	Various Places
[illegible], Walter J. Univ. of California, Berkeley	Physics	6/15-7/7	Various Places

Name	Field	Dates of Visit	Place Visited
[illegible], Eddie A. Columbia Univ.	Mathematics	1/22-4/7	Various Places
[illegible], Simon CNRS, Univ. of Paris.	Physics	4/24-5/4	Various Places
[illegible], Richard H. Robert E Gilliam Engin. Coll.	Physics	4/15-5/5	Thunderbird
[illegible], Walter Univ. of Chicago	Physics	4/24-5/8	Various Places
[illegible], Alan M. Univ. of Del., Newarke	Physics	4/25-5/5	Various Places
[illegible], Norman F. Harvard Univ.	Physics	5/21-5/31	Various Places
[illegible], Paul Rutgers Univ., Piscataway, N.J.	Physics	4/5-5/1	Various Places
[illegible], Walter Univ. of California, Santa Cruz	Physics	4/19 /31	Various Places
[illegible], Gordon Florida State Univ.	Physics	4/15-5/22	Various Places
[illegible], Harold A. Dr. Univ. of N.Y., Stony Brook, N.Y.	Physics	4/24-5/31	Various Places
[illegible], John Dr. Univ. of N.Y., Stony Brook, N.Y.	Physics	4/1-5/31	Various Places
[illegible], Donald P. Delaware Univ. of Tech.	Engineering	12/29-2/25	Mobile

Technical Visitations 1963 (Cont'd)

Name	Field	Dates of Visit	Place Visited
[illegible], Jay M. Mass Transport Univ.	Biology	6/25-7/6	Various Places
[illegible], E.H. Transmissions Univ. Univ.	Engineering	9/8-9/17	Various Places
[illegible], Robert Nuclear Chicago	Biology	6/23-7/12	Various Places
[illegible], Jackson H. Brookhaven Nat.	Biology	6/23-7/22	Various Places
[illegible], Theodore H. Univ. of Cal., San Diego	Biology	6/11-7/24	Various Places
[illegible], John D. Univ. Univ. Marine Lab.	Biology	6/23-7/7	Various Places
[illegible], Edward F. Wisconsin		1/3-1/9	Begnigan
[illegible], Rudolf Washington Univ. Univ.	Biology	6/25-7/7	Various Places
[illegible], Luther Wisconsin State Univ.	Chemistry	12/30-12/31	Various Places
[illegible], H. Burrows Univ. Univ. of N.Y., Stony Brook, N.Y.	Biology	6/24-7/4	Begnigan
[illegible], Donald S. Univ. of Texas	Biology	6/23-7/5	Various Places

Name	Title	Dates of Meals	Place Visited
[illegible], James Univ. of Washington	Welcome	6/22-5/4	Bungalows
[illegible], Earl F. Wisconsin Univ.	Welcome	6/24-5/4	Various Places
[illegible], John W. Washington Univ.	Welcome	6/24-5/8	Various Places
[illegible], William [illegible] Training Service	Welcome	6/24-5/7	Various Places
[illegible], Sergeo A. Univ. of California	Welcome	6/24-5/10	Various Places
[illegible], George W. Harvard Univ.	Welcome	1/5-5 & 2/5-1	Natural & Chandigarh
[illegible], William O. Univ. of Col., Riverside	Welcome	6/24-5/5	Various Places
[illegible], Leland S. Indiana Univ.	Welcome	6/24-5/5	Various Places
[illegible], Calvin Univ. of Texas	Welcome	6/24-5/5	Various Places
[illegible], Paul S. Univ. of Col., Los Angeles	Welcome	6/24-5/22	Various Places
[illegible], Thomas A. Washington		6/25-6/30	Bungalows & Delhi

Name	Field	Dates of Visit	Places Visited
[illegible], James D. Bell Telephone Lab.	Mathematics	6/23-6/30	Smith & Indiana
[illegible], Harold W. Univ. of Chicago	Biology	6/24-7/5	Various Places
[illegible], R.A. Wisconsin	Biology	6/24-7/22	Various Places
[illegible], Anthony Indiana Univ.	Biology	12/3-12/4	Bangalore
[illegible], Marvin W. New Hampshire Univ.	Biology	[illegible]	Various Places
[illegible], Richard D. Univ. of Michigan	Biology	6/22-7/21	Various Places
[illegible], W.D. Univ. of Tennessee (U.S.)	Biology	6/25-7/2	Bangalore

Invited Visitors [illegible] (FY-1977)

Name	Field	Dates of Visit	Phone Number
[illegible], R.F. [illegible]	Biology	2/3-2/5	[illegible]
[illegible], Gabor B. [illegible]	Chemistry	3/8-3/9	[illegible]
[illegible], John [illegible]	Mathematics	3/22-3/23	[illegible]

[illegible]

[illegible]

1. "[illegible]" [illegible]

2. [illegible]

3. "[illegible]" [illegible]

4. "[illegible]" [illegible]

5. "[illegible]" [illegible]

6. [illegible]

> [illegible]

[illegible]

1. "Economics in [illegible]," [illegible] [illegible] [illegible]

[illegible]. "Chemistry: Science and Innovation." Proceedings of the Conference on Chemical Education and Research held at Zaragoza and Bangalore, Jan. [illegible], sponsored by WCOM, IAUC and UCF.

[illegible]. Instructional monograph on Chemistry, for [illegible] and [illegible] students. Prepared by the Department of Public Instruction in cooperation with Institute of Science Education, Kuwait. Pilot Wing, Bangalore-[illegible], with the cooperation of UCF consultant.

[illegible]. "Educational Centers in Chemistry, Phase I and II." Dr. E. J. Sundaramurthy. Community Science Center, Ahmedabad. Phase Report Series Community Science Centers I and I in India monograph.

[illegible]. "Chemistry - Revolution." Prepared by the Chemistry Panel, WCOM [illegible].

[illegible]. "Chemistry and Environmental." Panel, R. D. Panel, Indian Public Engineering. Panel of the Chemistry monograph series sponsored by the WCOM.

[illegible]. "The Dilemma of the Chemistry Syllabus for [illegible] Phase I." Prepared by the CCLP in Chemistry, Punjab University, Chandigarh. This syllabus has been adopted by the most universities in the Punjab, Haryana and Himachal Pradesh. It represents a general chemistry syllabus, with [illegible] Laboratory Manual [illegible] I and II. A Teacher's Guide has also been published for New Dimensions. The second part Dimensions has also to be published.

Forthcoming Work:

[illegible]. Textbook series. Textbook prepared by WCOM [illegible], Bombay, with support from [illegible]. Have being prepared by Tata Mcgraw-Hill, Bangalore.

[illegible]

[illegible]

[illegible]

[illegible]

1. [illegible] Physics, [illegible] in Solar Storage [illegible], Tokyo Conference on [illegible].

2. [illegible] Conversion Investigations by [illegible], Physics, Wayne State University, [illegible] [illegible].

3. [illegible] Measurements in Mach [illegible] by [illegible] Board of Scientific Societies, Bulgaria, [illegible] [illegible], [illegible] by [illegible], Bulgaria.

4. [illegible] for Scientific and Engineering Information, [illegible], [illegible], [illegible] [illegible], [illegible], [illegible], [illegible] [illegible] Board of Scientific Societies, Bulgaria.

5. "Physics, Chemistry of Science in Colleges, Laboratory [illegible]" [illegible] by Prof. [illegible], [illegible], [illegible], [illegible] by Physics Department Conference [illegible] [illegible] by [illegible].

6. "Journal of Physics [illegible]," [illegible] by [illegible] Dr. [illegible], [illegible], National Physical Laboratory, and Prof. [illegible], [illegible], [illegible] University, [illegible].

7. [illegible] Measurements in Physics for [illegible] Practice, Prepared by the Department of Public Instruction in [illegible], [illegible] Institute of Science [illegible], [illegible] Point [illegible], [illegible].

8. "Physics in Science-Teaching and Communication," Physics Image of the Conference on Physics [illegible] and Research, [illegible], [illegible] by the [illegible], [illegible], [illegible] and [illegible].

9. Physics Experiments Modified for Teaching School Students, Prepared by the Physics Dept. [illegible] [illegible].

10. "Physics News," Bulletin of the Indian Physics Association, [illegible] [illegible] [illegible] [illegible] of the [illegible] [illegible] in Physics [illegible] [illegible].

11. [illegible] published monthly by the [illegible] Engineering Physics Dept.

12. [illegible] Bulletin published by the Engineering Sciences Physics Dept.

13. "[illegible]" a report by the Adaptive Engineering Physics Dept.

Equipment [illegible]

1. [illegible] manufactured by Dynamic Corporation, Bangalore. Widely used in [illegible], [illegible] Indonesia.

2. [illegible] made by Michaels Enterprises, Delhi. Widely used in [illegible]. The [illegible] is [illegible] developed a family of [illegible] in [illegible].

3. [illegible] Ray [illegible] developed at Bhabha Physical Laboratory

4. [illegible] manufactured by Cameron Workshop, New Delhi

5. Functional Prosthesis. Although functional [illegible] with [illegible], [illegible] manufacturers being encouraged manufacturers to develop. Some [illegible] from [illegible] companies. Used in [illegible] Indonesia.

6. Prosthetic devices [illegible] with physical physical [illegible], Kalyani Prosthesis. Developed and field tested with [illegible] of [illegible] [illegible].

7. [illegible] Physics Laboratory and Scientific Equipment Development of [illegible].

[illegible]

1. [illegible] Working [illegible], [illegible] at [illegible], [illegible], [illegible], [illegible] Institute School of [illegible] Technology.

2. [illegible] Working [illegible], [illegible] at [illegible], [illegible], [illegible] Institute School of [illegible] Technology.

3. Curriculum materials for [illegible] type First Employee Course, in Purchasing Methodology, prepared by [illegible] of Technical Education, Commonwealth of Puerto Rico, [illegible].

4. The Education Training - Learning Process, Four Complete programs of the Curriculum Development Center, College of Engineering, Cebu City, [illegible].

5. Curriculum development and workshops in instructional techniques and media skills in a functional approach to technical education Curriculum Development Center, T.V.T.C. [illegible].

Teaching Aids

1. [illegible] Workshop program, for Workshops Curriculum Development [illegible] of Education of Technical Education, [illegible].

[illegible]

[illegible]

1. [illegible] Kitabgar Handbookmaker, [illegible] by [illegible] [illegible], Bangalore University

2. [illegible] Kitabgar Handbookmaker, [illegible] by [illegible] [illegible], Bangalore University.

[illegible] [illegible] [illegible]
(Bookbinding Manuscript Conservation)

1. "[illegible] [illegible]" [illegible], (Bookbinder Conservator [illegible] [illegible] I, II, III and IV, English, Marathi, [illegible], Gujarati and Kannada.

2. "[illegible] [illegible]" [illegible], (Paper Conservator [illegible] I, II, III and IV, English, Marathi, [illegible], Gujarati and Kannada.

3. "[illegible] [illegible] handbookmaker [illegible] [illegible] [illegible], [illegible] I, II, III and IV English, Marathi (Bookbinder [illegible] and [illegible] Gujarati [illegible] [illegible] [illegible] [illegible] [illegible])

4. [illegible] [illegible], "[illegible] [illegible] [illegible] handbookmaker, [illegible] [illegible], [illegible] [illegible] [illegible] [illegible] Gujarati [illegible], [illegible], [illegible] [illegible] [illegible] by [illegible] [illegible] [illegible], [illegible] [illegible] [illegible] [illegible], Bangalore.

[illegible]

[illegible] [illegible], [illegible] [illegible] by [illegible] [illegible] [illegible].

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

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[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Dr. [illegible]
Chairman
University Kinanya [illegible]

Dr. [illegible]
Scientific Attaché to the
Embassy of Belgium

Dr. [illegible]
Director
Belgian Institute of Science
[illegible]

Prof. [illegible]
Director
Physical Chemistry of Biomolecules
Processes & Biology

Prof. [illegible]
Joint Institute for Nuclear Research, Dubna
University of Leningrad and
Moscow University

Prof. [illegible]
University Bar-Ilan

Prof. [illegible]
Bulgarian Academy
Nuclear Physics Laboratory

Prof. [illegible]
Algerian University

Prof. [illegible]
University of Dublin

Prof. [illegible]
Belgian Institute of Radioisotopes
Budapest

Prof. [illegible]
Jan Kochanowski University Kielce

Prof. [illegible]
Chair Physics of Physics
University College of Science
Ljubljana

Prof. [illegible]
Belgian Institute of Radioisotopes
Dublin

Prof. [illegible]
Algerian Atomic Energy Commission

Prof. [illegible]
Pavia University

Prof. [illegible]
University of Dublin

Prof. [illegible]
Leningrad University

Prof. [illegible]
Tel Aviv University

Prof. [illegible]
Bulgarian Academy of Sciences

Prof. [illegible]
Tel Aviv University

Prof. [illegible]
Belgian Institute of Radioisotopes
[illegible]

Prof. [illegible]
Tel Aviv University

Dr. [illegible]
Tel Aviv University

Dr. [illegible]
Tel Aviv University of Pharmaceutical
Research in
Strasbourg

Dr. [illegible]
[illegible]
[illegible] Physical Laboratory

Prof. [illegible]
[illegible] University of [illegible]
[illegible]

Prof. [illegible]
[illegible] University

Prof. [illegible]
[illegible] University

Prof. [illegible]
[illegible] University

Prof. [illegible]
[illegible] University

Dr. [illegible]
[illegible]
[illegible] University

Prof. [illegible]
[illegible] University of [illegible]
[illegible]

Dr. [illegible]
[illegible]
[illegible] Physics Laboratory
[illegible]

Prof. [illegible]
[illegible] University

Prof. [illegible]
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[illegible] University

Prof. [illegible]
[illegible] University

Prof. [illegible]
[illegible] University of [illegible]
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Dr. [illegible]
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Dr. [illegible]
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[illegible] University

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[illegible]

[illegible]

[illegible]

Prof. A.K. Gayen
Indian Institute of Technology
Kharagpur

Prof. P.C. Jain
Indian Institute of Technology
Bombay

Prof. M.S. Narasimhan
Tata Institute of Fundamental Research
Bombay

Prof. R.S.L. Srivastav
Indian Institute of Technology
Kanpur

Dr. V.S.A. Rao
Indian Institute of Science
Bangalore

Prof. S.K. Srinivasan
Indian Institute of Technology
Madras

Dr. L.S. Chandrakant
Director
Institute of Applied Manpower Research
New Delhi

Prof. K.G. Ramanathan
Tata Institute of Fundamental Research
Bombay

Prof. R. Narsimhan
Tata Institute of Fundamental Research
Bombay

Prof. O.P. Bagai
Punjab University

Prof. S. Izhar Husain
Aligarh Muslim University

Prof. B.M. Udgaonkar
Tata Institute of Fundamental Research
Bombay

Prof. Rais Ahmed
Aligarh Muslim University

Prof. D.S. Kothari
President
Indian National Science Academy
New Delhi

Shri Shanti Narayan
Dean of Colleges
University of Delhi

Prof. Satish Chandra
Vice Chairman
University Grants Commission

Dr. R.D. Deshpande
Joint Secretary
University Grants Commission

Dr. T. Soundarajan
Madurai University

Dr. T. Parthasarathy
Indian Statistical Institute
Calcutta

Dr. R.S. Nanda
Indian Institute of Technology
Kharagpur

Dr. M.B. Banerjee
Himachal Pradesh University

Dr. (Miss) Shashi Prabha Arya
University of Delhi

Dr. P.K. Ghosh
University College of Science
& Technology
Calcutta

Dr. Y. Sitaraman
Kerala University

Dr. I.B.S. Passi
Kurukshetra University

Shri A.R. Sen
Visva-Bharati
Santiniketan

Dr. Phoolan Prasad
Indian Institute of Science
Bangalore

Dr. J.B. Shukla
Indian Institute of Technology
Kanpur

Dr. B.L. Sharma
Allahabad University

Dr. R.K. Raman
Birla Institute of Technology
& Science
Pilani

Prof. M.S. Raghunathan
Tata Institute of Fundamental
Research
Bombay

Dr. A. Ramachandran
Secretary
Department of Science &
Technology
Government of India
New Delhi

Dr. B.D. Nag Chaudhuri
Scientific Advisor to the
Minister of Defence
New Delhi

Names of Foreign Delegates

Dr. Richard Anderson
Louisiana State University
Baton Rouge, Louisiana

Dr. Robert G. Bartle
University of Illinois
Urbana, Illinois

Dr. R.H. Bing
University of Wisconsin
Madison, Wisconsin

Dr. Burton W. Jones
The University of Colorado
Boulder, Colorado

Dr. John L. Kelley
University of California
Berkeley, California

Dr. William H. Kruskal
University of Chicago
Chicago, Illinois

Dr. Robert H. McDowell
Washington University
St. Louis, Missouri

Dr. P.R. Masani
Pittsburgh University
Pittsburgh, Pennsylvannia

Dr. Henry O. Pollak
Bell Laboratories
600 Mountain Avenue
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Dr. William G. Rosen
National Science Foundation
Washington, D.C.

Dr. Arnold E. Ross
Ohio State University
Worthington, Ohio

Professor Marshall H. Stone
University of Massachusetts
Amherst, Mass.

Dr. Maynard D. Thompson
Indiana University
Bloomington, Indiana

Dr. Bryan Wilson
Assistant Director (Math)
Center for Educational
Development Overseas
Tavistock House South
Tavistock Square, London

Prof. A. Bajpai
Professor of Mathematics
Education
University of Loughborough
Loughborough

Dr. E.A. Maxwell
Queen's College
Cambridge

APPENDIX O

NATIONAL COUNCIL OF SCIENCE EDUCATION*

A. MEMBERS OF THE NCSE

1. Dr. D.S. Kothari, Chairman — Chairman
   University Grants Commission
   New Delhi

2. Dr. Vikram A. Sarabhai, Chairman
   Atomic Energy Commission
   Trombay, Bombay

3. Dr. Atma Ram, Director-General
   Council of Scientific & Industrial Research
   New Delhi

4. Dr. A.C. Joshi, President
   All India Science Teachers' Association
   Chandigarh

5. Shri L.S. Chandrakant — Member-Secretary
   Joint Educational Adviser
   Ministry of Education & Youth Services
   New Delhi

6. Prof. B.P. Seshachar, Head
   Zoology Department
   Delhi University, Delhi

7. Prof. A. Ramachandran, Director
   Indian Institute of Technology
   Madras

8. Dr. P.K. Kelkar, Director
   Indian Institute of Technology,
   Kanpur

9. Prof. R.N. Dogra, Director
   Indian Institute of Technology
   Delhi

10. Dr. K.L. Dig
    79 Sundar Nagar
    New Delhi

11. Dr. B.P. Pal, Director-General
    Indian Council of Agricultural Research
    New Delhi

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* This information was taken from the "Information Brochure, 1970" published by Amar Printing Press, E-24/3 Hauz Khas, New Delhi-16

12. Prof. T.S. Sadasivan, Director
    Botany Department
    University of Madras, Madras

13. Prof. T.R. Seshadri, Professor Emeritus
    Department of Chemistry
    Delhi University, Delhi

14. Prof. N.V. Subba Rao, Principal
    University College of Science
    Osmania University, Hyderabad

15. Prof. B.D. Nag Chaudhury, Member (Education)
    Planning Commission
    New Delhi

16. Prof. S.V.C. Aiya, Director
    National Council of Educational Research & Training
    New Delhi

17. Dr. (Miss) Kaumudi, Deputy Financial Adviser
    Ministry of Education
    Shastri Bhavan, New Delhi

B. NCSE SECRETARIAT

1. Dr. R. D. Deshpande, Development Officer, UGC &
   Chief Executive, NCSE
   University Grants Commission, New Delhi

2. Dr. K.N. Saxena, Deputy Chief Executive
   National Council for Science Education
   New Delhi

C. ADVISORY PANEL MEMBERS, NCSE **

CHEMISTRY

1. Prof. H.J. Arnikar, Head
   Department of Chemistry
   Poona University, Poona

2. Prof. G. Gopala Rao, Head
   Department of Chemistry
   Andhra University, Waltair

3. Prof. R.C. Mehrotra, Head
   Department of Chemistry
   University of Rajasthan, Jaipur

4. Prof. R.C. Paul, Head
   Department of Chemistry
   Panjab University, Chandigarh

5. Prof. V. Ramakrishna, Head
   Department of Chemistry
   Indian Institute of Technology, New Delhi

6. Prof. C.N.R. Rao, Head
   Department of Chemistry
   Indian Institute of Technology, Kanpur

7. Prof. T.R. Seshadri, Professor Emeritus
   Department of Chemistry
   Delhi University, Delhi

8. Prof. N.V. Subba Rao, Principal — Convener
   University College of Sciences
   Osmania University, Hyderabad

** Some of these panels were reconstituted in 1971

MATHEMATICS

1. Prof. V.S. Huzurbazar, Head — Convener
   Department of Mathematics
   Poona University, Poona

2. Prof. J.N. Kapur, Head
   Department of Mathematics
   Indian Institute of Technology, Kanpur

3. Prof. U.N. Singh, Head
   Department of Mathematics
   Delhi University, Delhi

4. Prof. P.C. Vaidya, Head
   Department of Mathematics
   Gujarat University, Ahmedabad

5. Prof. T. Venkataraman, Head
   Department of Mathematics
   Madurai University, Madurai

6. Prof. R.S. Verma, Head
   Department of Mathematics
   Delhi University, Delhi

BIOLOGY

1. Prof. K.C. Bose, Head
   Zoology Department
   Ranchi University, Ranchi

2. Dr. M.S. Dulvile, Head
   Zoology Department
   University School of Sciences, Ahmedabad

3. Prof. M.P. Inamdar, Head
   Zoology Department
   Institute of Science, Bombay

4. Prof. B.M. Johri, Head
   Botany Department
   Delhi University, Delhi

5. Prof. S. Krishnaswamy, Head
   Zoology Department
   Madurai University, Madurai

6. Prof. T.S. Mahabale, Head
   Botany Department
   Poona University, Poona

7. Prof. R. Misra, Head
   Botany Department
   Banaras Hindu University, Varanasi

8. Prof. K.K. Nayar, Head
   Zoology Department
   Kerala University, Trivandrum

9. Prof. T.S. Sadasivan, Director — Convener
   Botany Department
   Madras University, Madras

10. Prof. P.R. Seshachar, Head
    Zoology Department
    Delhi University, Delhi

11. Prof. H.R. Suxena, Head
    Botany Department
    Osmania University, Hyderabad

PHYSICS

1. Dr. V.G. Bhide, Deputy Director — Convener
National Physical Laboratory
New Delhi

2. Prof. J. Bhiraseenachar, Head
Department of Physics
Sri Venkateswara University, Tirupati

3. Prof. S. Chandrasekhar, Head
Department of Physics
Mysore University, Mysore

4. Prof. L.S. Kothari
Department of Physics
Delhi University, Delhi

5. Prof. B.D. Nag Chaudhury
Member (Education)
Planning Commission New Delhi

6. Prof. D.D. Pant Head
Department of Physics
The D.S.B. College, Nainital

7. Prof. G.N. Ramachandran, Head
Department of Physics
Madras University, Madras

8. Prof. B. Ramachandra Rao, Head
Department of Physics
Andhra University, Waltair

9. Dr. K.B. Shah
Director
Community Science Centre, Ahmedabad

MEDICINE

1. Dr. B.K. Anand
   Professor of Physiology & Vice-Dean
   All India Institute of Medical Sciences, New Delhi

2. Dr. B.K. Bachawat
   Professor of Biochemistry
   Christian Medical College & Hospital, Vellore

3. Dr. J.B. Chatterjea, Director
   School of Tropical Medicine
   Calcutta

4. Lt. Gen. S.N. Chatterjee, MC, PHS,
   Director of Medical Services
   Army Headquarters, New Delhi

5. Dr. P.N. Chuttani
   Dean & Director-Professor of Medicine
   Postgraduate Institute of Medical Education & Research
   Chandigarh

6. Col. S.K. Mazumdar, Director
   Institute of Nuclear Medicine & Allied Sciences
   Delhi

7. Dr. V. Ramalingaswami
   Professor of Pathology
   All India Institute of Medical Sciences, New Delhi

8. Dr. Ramji Das
   Professor & Head of the Department of Anatomy & Principal
   Medical College, Patiala

9. Dr. U.K. Sheth, Head
   Department of Pharmacology
   Seth G.S. Medical College, Bombay

10. Dr. A. Venugopal, Hony. Surgeon
    Govt. General Hospital & Kennington Nursing Home
    Madras

11. Dr. K.L. Wig ..... Convener
    Formerly Director
    All India Institute of Medical Sciences, New Delhi

POLYTECHNIC

1. Dr. S.K. Barua
   Director of Technical Education Assam
   Shillong

2. Prof. S.K. Das, Principal
   Technical Teachers Training Institute
   Madras

3. Shri S.P. Datta, Director
   Technical Education
   Government of Rajasthan, Jodhpur

4. Shri M.K. Ganesan, Principal
   Central Polytechnic
   Madras

5. Prof. A.A. Jambulingam, Principal
   Technical Teachers Training Institute
   Madras

6. Shri R.N. Kapoor, Principal
   Allahabad Polytechnic
   Allahabad

7. Prof. P.S. Kalwachwala
   Director of Technical Education
   Government of Gujarat, Ahmedabad

8. Prof. A.A. Kulkarni, Head
   Physics Department
   Victoria Jubilee Technical Institute, Bombay

9. Shri G.Y. Manmulkar ..... Convener
   Staff Training Officer
   Tata Iron & Steel Company Ltd., Jamshedpur

10. Dr. T. Muthian
    Director of Technical Education
    Madras

11. Shri R. Muthuswami
    Superintendent of Training
    Bhilai Technical Institute, Bhilai Steel Plant, Bhilai

12. Col. S.G. Pendse
    Director of Employment & Training
    Directorate-General of Employment & Training, New Delhi

13. Shri Y. Saran, Principal
    S.V. Government Polytechnic
    Bhopal

14. Shri N.N. Sen Gupta, Principal
    Calcutta Technical School
    Calcutta

ENGINEERING

1. Dr. G.N. Acharya, Head
   Electronic Instrumentation
   Central Electronics Engg. Res. Inst., Pilani

2. Dr. Braham Prakash, Director
   Metallurgy Group
   Atomic Energy Establishment, Bombay

3. Shri G.R. Damodaran, Principal
   P.S.G. College of Technology
   Coimbatore

4. Prof. R.N. Dogra, Director — Convener
   Indian Institute of Technology
   New Delhi

5. Dr. Jagdish Narain
   Department of Civil Engineering
   University of Roorkee, Roorkee

6. Dr. C.S. Jha, Head
   Department of Electrical Engineering
   Indian Institute of Technology, New Delhi

7. Prof. N. Keshav Murthy
   Department of Electrical Engineering
   Indian Institute of Technology, Kharagpur

8. Prof. R.C. Narayanamurthy, Head
   Department of Mechanical Engineering
   Indian Institute of Technology, Madras

9. Prof. Ramaswamy, Director
   Structural Engineering Research Centre
   Roorkee

10. Dr. L.S. Srinath
    Professor of Electrical Engineering
    Indian Institute of Technology, Kanpur

11. Dr. M.M. Swani, Head
    Department of Textile Technology
    Indian Institute of Technology, New Delhi

12. Dr. D. Venkatesvalu, Head
    Department of Chemical Engineering
    Indian Institute of Technology, Madras

BIOMEDICAL ENGINEERING

1. Shri L.S. Chandrakant
   Jt. Educational Advisor
   Ministry of Education & Youth Services, New Delhi

2. Surgeon Comdr. A.K. Deb
   Defence Electronics & Research Establishment
   Bangalore

3. Prof. R.M. Dogra, Director
   Indian Institute of Technology
   New Delhi

4. Prof. S.K. Guha
   Department of Electrical Engineering
   Harcourt Butler Technological Institute, Kanpur

5. Col. S.K. Majumdar, Director
   Institute of Nuclear Medicine & Allied Sciences
   Delhi

6. Dr. A.S. Paintal, Director
   V.P. Chest Institute
   University of Delhi, Delhi

7. Prof. A. Shankaran
   Professor of Orthopaedic Surgery
   Maulana Azad Medical College, New Delhi

8. Dr. K.L. Wig — Convener
   Formerly Director
   All India Institute of Medical Sciences, New Delhi

APPENDIX P

Participants Trained (7) CY-1967

Name	Present Position	Dates of Study Tour
KOTHARI, L.S. Delhi University	Professor of Physics	6/21-8/5
KRISHNASWAMY, S. Madurai University	Head Department of Biological Sciences	8/2-10/4
NAG CHAUDHURI, B.D. Ministry of Defence	Scientific Advisor to the Minister of Defence	6/8-8/10
PAUL, R.C. Panjab University	Head Department of Chemistry	6/14-9/25
SINGH, U.N. Delhi University	Head Department of Mathematics	8/2-9/29
SUBBA RAO, N.V. Osmania University	Head Department of Chemistry	8/14-10/5
SWANI, N.M. Indian Institute of Technology, Delhi	Head Department of Textile Technology	6/8-7/29

Participants Trained (18) CY-1968

Name	Present Position	Dates of Study Tour
BHIDE, V.G. National Physical Laboratory	Deputy Director	9/28-12/27
DESHPANDE, R.D. University Grants Commission	Joint Secretary	8/14-10/8
JHA, C.S. IIT New Delhi	Professor & Head Dept. of Electrical Engineering	8/1-10/1
KAPOOR, R.N. Allahabad Polytechnic	Principal	8/7-11/10
KATTI, R.K. IIT Bombay	Professor & Head Dept. of Civil Engineering	8/3-10/27
MOHAMAD, Jan Jammy & Kashmir University	Professor & Head Dept. of Mathematics	11/2/68-2/7/69
NARAYANAMURTHI, R.G. IIT Madras	Professor & Head Dept. of Mechanical Engineering	8/3-11/21
NIGAM, A.N. University of Rajasthan	Reader Dept. of Physics	9/28-12/27
PANT, D.D. D.S.B. Government College, Nainital	Principal	9/28-12/27
PATEL, R.P. Sardar Patel University	Reader Dept. of Chemistry	9/11-12/6

Name	Present Position	Dates of Study Tour
RAJAMANNAR, P.V. Delhi University	Reader Dept. of Zoology	10/7/68-1/3/69
RAO, B. Ramachandra Andhra University	Professor & Head Dept. of Physics	9/28-12/31
REDDI, O.S. Osmania University	Professor & Head Dept. of Genetics	9/18-12/12
ROHATGI-MUKHERJEE, K.K. Jadavpur University	Reader Dept. of Chemistry	8/6-11/18
SARAN, Y. Technical Teachers Trg. Inst., Bhopal	Principal	9/8-12/9
SRINATH, L.S. Indian Institute of Science	Professor Dept. of Mechanical Engineering	9/6-12/5
VAIDYANATHAN, T.K. Technical Teachers Trg. Inst., Chandigarh	Principal	9/23-12/27
WANCHOO, V.N. Directorate of Education, Delhi	Additional Director of Education	9/4-11/16

Participants Trained (15) CY-1969

Name	Present Position	Dates of Study Tour
ARNIKAR, H.J. Poona University	Senior Professor & Head Dept. of Chemistry	9/20/69-1/6/70
AULUCK, F.C. Delhi University	Head Physics & Astro-Physics Dept.	9/30-12/30
BANERJEE, D. Bengal Engineering College, Calcutta	Principal	9/24-12/27
BHATT, K.J. L.D. College of Engineering, Ahmedabad	Professor & Head	9/1-12/9
BOSS, T.R. Directorate of Technical Education Government of Andhra Pradesh	Director	9/3-12/12
DUBALE, M.S. Gujarat University	Reader & Head Dept. of Zoology	9/3-12/6
GANESAN, M.K. College of Engineering, Madras	Head Curriculum Development Cell	9/1-12/9
IYENGAR, S. State Council of Educational Research and Training, Hyderabad	Lecturer	9/3-12/12
KULKARNI, A.A. V.J. Technical Institute, Bombay	Professor & Head	8/27-12/9

Name	Present Position	Dates of Study Tour
MANDE, C. Nagpur University	Professor & Head Dept. of Physics	9/25/69-1/5/70
MEHROTRA, R.C. Rajasthan University	Professor & Head Dept. of Chemistry	10/11/69-1/4/70
NAGARAJAN, A. Univ. Botany Laboratory, Madras	Zoologist	9/14/69-1/1/70
PITRE, B.G. The Doon School, Dehra Dun	Senior Physics Master	8/26-12/4
PRASAD, Rajender NCERT (R.C.E.) Bhopal	Field Advisor	9/14/69-1/1/70
SHENOI, K.V. Directorate of Public Instruction, Mysore	Jt. Director of Public Instruction	9/3-12/4

Participants Trained (19) CY-1970

Name	Present Position	Dates of Study Tour
BEEDKAR, S.R. Directorate of Technical Education Government of Madhya Pradesh	Director	1/29-5/23
BHIMASENACHAR, J. Sri Venkateswara University	Professor & Head Dept. of Physics	10/3-12/29
BISWAS, M.M. Technical Teachers Trg. Inst., Calcutta	Professor & Head Dept. of Science	10/3/70-1/4/71
BOSE, A.N. National Council for Educational Research & Training, New Delhi	Head Dept. of Science	9/26-12/16
GOPINATH, N. All India Institute of Medical Sciences	Professor of Thoracic Surgery	10/3-12/24
GUHA, S.K. Harcourt Butler Tech. Inst., Kanpur	Professor & Head Dept. of Electrical Engineering	9/5-11/14
KUTTY, M.N. Madurai University	Reader Dept. of Biological Sciences	9/5-11/29
LAKHANPAL, M.L. Panjab University	Professor Dept. of Chemistry	10/3-12/16
MENON, K.B. IIT Kharagpur	Head Dept. of Electrical Engineering	9/26-12/17
PATHAK, P.D. Gujarat University	Head Dept. of Physics	9/5-12/6

Name	Present Position	Dates of Study Tour
PURI, M.R. University of Jammu	Professor Dept. of Mathematics	9/26-12/22
ROW, L. Ramachandra Andhra University, Waltair	Professor & Head Dept. of Chemistry	9/26-12/13
SARAF, B.L. Rajasthan University	Professor & Head Dept. of Physics	9/26-12/21
SEN, S.N. M.S. University of Baroda	Head Dept. of Electrical Engineering	9/5-12/15
SHAH, (Mrs.) Madhuri R. Bombay Municipal Corporation	Education Officer	5/8-8/15
SHARMA, A.K. Panjab University	Reader Dept. of Chemistry	1/30-5/2
SINHA, D.K. Jadavpur University	Reader Dept. of Mathematics	9/26-12/7
SIVALINGAM, T.P. Directorate of Technical Education Government of Tamil Nadu	Director	9/5-12/19
SUKENA, M.R. Osmania University	Professor & Head Department of Botany	10/3-12/29

Participants Trained (18) CY-1971

Name	Present Position	Dates of Study Tour
ABROL, M.L. P.G. D.A.V. College, New Delhi	Head Dept. of Mathematics	6/20-9/6
DAS GUPTA, S.M. Indore University	Director, G.S.I.T.S. Indore & Professor of Electronics	7/11-10/1
DEO, B.B. Utkal University	Professor Dept. of Physics	2/14-6/26
DUBE, Y.M. State Institute of Science Education Poona	Director	6/20-9/12
GEORGE, M.V. IIT Kanpur	Professor Dept. of Chemistry	9/18-12/14
GOEL, S.N. Jodhpur Polytechnic	Principal	7/18-10/11
JAIN, A.C. Jammu University	Professor & Head Dept. of Chemistry	7/18-10/1
KAR, Subir IIT Bombay	Professor & Head Dept. of Mechanical Engineering	7/18-9/17
NARAYAN, D. Shankar University Grants Commission	Additional Secretary	8/15-10/15

Name	Present Position	Dates of Study Tour
RAJAN, J.M.T. State Institute of Science Education Bangalore	Director	6/19-9/17
RAMCHANDRAN, A. Dept. of Science and Technology	Secretary	9/19-11/20
RAMAKRISHNA, V. Defence Res. & Dev. Organization	Chief Scientist	1/10-4/5
RAO, P. Venkata IIT Madras	Professor & Head Dept. of Electrical Engineering	7/10-9/20
RAO, Rajamadhav Regional College of Education, Mysore	Head Dept. of Science (Physics)	6/12-9/17
RAO, T.S. Poona University	Reader Dept. of Nuclear & Rad. Chem.	9/5-11/8
SINGH, C.P. Agra College	Professor & Head Dept. of Zoology	7/14-9/24
TANDON, H.D. All India Institute of Medical Sciences	Professor & Chairman Dept. of Pathology	9/26-12/7
VARMA, J. Udaipur University	Professor & Head Dept. of Physics	8/1-9/19