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Mr. Edward Smith
Project Officer/Liberia
Room 2441 Africa/DR
Agency for International Development
Department of State
Washington, D.C. 20520

Dear Mr. Smith:

Subject: Liberia Vocational Training Project Termination Activities
(Contract IQC PDC-1406-I-01-1063-00, Work Order #1)

Enclosed please find two copies of the final report prepared by Evelyn Barnes and Kenneth Gibbs for the above-referenced project activity. Copies of this report were left in Liberia with the AID Mission.

We look forward to receiving any comments you may have on the report. Please inform us when the report has been accepted and approved by AID in order to permit us to make the final fee payment to our consultants who prepared the report.

Sincerely yours

Gary A. Walker
Vice President
International Programs

Encs.



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**LIBERIA VOCATIONAL TRAINING
PROJECT (669-0131)
TERMINATION ACTIVITIES**

Final Report

By

Evelyn Barnes

Kenneth Gibbs

September 11, 1982

FORWARD

This document is the final report on the Termination Activities for the Liberia Vocational Training Project 669-0131, June 14 to September 11, 1982. The two vocational specialists assigned to the project would like to recognize and express their sincere appreciation to the other members of the team, Mr. Arlef D. Kaba and Mr. Joseph K. Roberts. These two gentlemen served as our counterparts and worked tirelessly to assist us in the project objective of maximizing the utilization of materials and equipment developed/purchased under the contract. A very special thanks goes to Mr. Daniel N. Jappah, Sr., Principal of Booker Washington Institute, for his very excellent choice of counterparts and for supporting our efforts to acquire assistance whenever and wherever needed to complete project tasks. And lastly, we wish to thank the students, faculty and staff of BWI who have so warmly received and accepted our presence here on campus.

Kenneth P. Gibbs

Evelyn S. Barnes

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LIBERIA VOCATIONAL TRAINING PROJECT (669-0131)

TERMINATION ACTIVITIES

SUMMARY

Introduction

Project Paper 669-0131, Volume II, 1978, stated that the aim of Booker Washington Institute and its chief responsibility was to produce skilled workers for industrial, agricultural and commercial pursuits, capable of working with a minimum of supervision. The target was to increase the number of graduates from 125 in 1975 to approximately 400 employable workers annually. The maximum projected target capacity of Booker Washington Institute (BWI) was 1,500 students. The present enrollment is 986. There are 591 freshman, no sophomores since returning to the four year plan, 207 juniors and 188 seniors.

The recommended average intake was 500 and the average output 400. The freshman class exceeds the recommended number and the output is about half the recommended figure. The Project Paper stated that the intake of students in any given year should not exceed the output plus attrition of the previous year. There were 437 graduates in 1981 and eight recorded dropouts, so the intake should have been 445. The projected intake of 500 students per year was based on the planned expansion of BWI facilities. One building has been completed which added three more classrooms and three shops. The Business Education area was not discontinued so those

classrooms have not been freed for other classes. According to the staff 350 students in each freshman class would be the maximum that BWI could handle on the four year program and with the present facilities.

To regulate the flow of workers into the labor market the Project Paper recommended the allocation of student places by specialization. The recommended and present allocation follows:

	<u>Recommended</u>	<u>Present</u>
Agriculture	20%	16.5%
Auto Mechanics	10%	6.6%
Building Trades	16%	29.3%
Electricity	13%	6.0%
Electronics	7%	8.0%
Machinery	7%	7.1%
Business	20%	19.5%
Home Economics	7%	6.5%

To meet the recommended allocation of student places, the building trades overage would have to be reallocated to Agriculture, Auto Mechanics and Electricity. The remaining areas are in line with the recommended percentages.

According to the "Indicative Manpower Plan of Liberia for the period 1972-1982," 17,000 new skilled jobs would need to be filled during the ten year period. Assuming that all of these graduates were to work in the vocational area for which they were trained, BWI would have supplied 25 percent of the needed workers in 1981 and 11.4 percent of the workers needed in 1982.

The 17,000 figure was predicated on continued steady growth of the traditional agricultural sector as well as manufacturing, construction, government and other sectors. From 1979 to the present, however, growth in these sectors has been slowing down. Only the agriculture sector has registered slow but continuous growth. By increasing employment in agriculture the number of unemployed could be noticeably reduced. According to the USAID Mission Strategy Statement March, 1982, recent high school and university graduates have been unable to be absorbed in either the private or public sector. Taking these factors into consideration, it is apparent that the recommended and actual allocation of student places by specialization need to be adjusted to be more reflective of economic growth patterns.

Curriculum

The ratio of practical training to theoretical instruction was to be 60 percent practical to 40 percent theoretical. The present four year curriculum has retained the 60 - 40 ratio even though they have abandoned the three year curriculum previously recommended by the Ministry of Education and developed under Project 669-0131. Students have twenty hours a week in a trade and fifteen hours in academic courses. The objective is to prepare students for entry level jobs as well as for the West African Examination Council Exam on academic subjects.

The four year curriculum planned for BWI resembles the organic curriculum model designed by Robert M. Morgan and David S. Bushnell in 1967. The intent of their design was to

increase student options by emphasizing the articulation between academic and vocational learning by fusing the two programs but using preparation for a vocation as the primary vehicle. Upon leaving school, students would have entry-level skills or could continue in a technical institute or four year college. The financial costs of such a curriculum may ultimately result in BWI having to make a choice between vocational and academic preparation.

The modular form of instruction organized under Project 669-0131 has been rejected by the administration and teachers of BWI. The first modules (Appendix A) produced were not in a standard modular format. Some of the modules were written as workbooks, others were a series of handouts, and some were reading materials made into a book. These modules were used by the teachers but no evaluation data was collected and only a few of the materials are still available since they were not packaged by the Project. Modules developed following the visit of Doctors Lovelace and Perazolli February-March, 1981, (Appendix B) were in proper format. Most of these modules were never used by the teachers; therefore, no evaluation data was collected. There were thirteen of these modules packaged by the Project Team prior to their departure.

Staff

Booker Washington Institute has 45 vocational teachers and two lab technicians. The teachers and qualifications are included in Appendix E. The Academic subjects are taught by 35 teachers making a total of 82 teachers employed at BWI.

Booker Washington Institute is administered by a principal and one vice principal assisted by a guidance coordinator, a curriculum coordinator, vocational coordinator and a business manager. Six Liberians were given formal training at Prairie View A & M, Prairie View, Texas (Appendix F) as part of the Project. Two participants completed Masters Degrees, one in Industrial Education and Guidance and the other in Industrial Education and administration. One participant received a Bachelors Degree in Industrial Education while one received a certificate for six months training in Food Processing. Two participants completed two years of study under contract funds and have elected to complete their degree requirements on their own.

The two Master Degree trained participants were assigned according to their major; e. e., Guidance Coordinator and Vice Principal of Instruction. The Bachelor Degree trained participant was appointed to the position of Vocational Coordinator. Food Processing is not included in the four year curriculum plan; therefore, the training will not be utilized.

Facilities and Equipment

The project paper called for upgrading and expanding BWI plant and facilities. Campus renovations recommended by Prairie View are included in Appendix G. The contract was signed January 23, 1981, and work began February, 1981 on the renovation of classrooms and workshops. The following areas were renovated: electronic shop, electrical shop, building trades office area and the curriculum building which was not completed due to a dispute over payment.

The equipment provided by USAID is listed in Appendix H and the present plans for renovating and expanding shop space is included in Appendix K.

Under the Three Month Termination of Activities Contract the equipment was installed in the new Mechanical Trades Building. In the auto shop an additional classroom, tool room and parts storage area has been built. The old machine shop has been divided into two classrooms, a teachers lounge, and the diesel mechanics area. A classroom will be built in the diesel area, also. The parts needed to complete the installation of the lift have been purchased. The plans have been drawn to build an annex to the Building Trades facilities which will provide a woodworking shop. At present the production of furniture and the maintenance sections take up all of the shop space. Another annex is planned for the masonry area.

Electricity will remain in its present location; however, Air Conditioning/Refrigeration will be moved to the old welding shop now that a teacher has been appointed. In the Electronics building a wall has been taken out to enlarge the lab area. Additional wiring has been installed as well as air conditioning and rogue bars.

In Home Economics the kitchen range has been installed during the Three Month Contract. The cafeteria equipment has been set up and the electrical wiring is being installed.

Supporting Systems

The following sub-systems recommended in the Project Paper Volume I were developed by Prairie View A and M:

- . Vocational Education Advisory Services to the Government of Liberia
- . A Plan for Training Program for Instructional Personnel at Booker Washington Institute
- . A Plan for Participant Training
- . A Performance Evaluation System for Instructional Staff
- . A Plan for Instructional Schedules
- . Teacher Assignments and Student Course Requirements
- . An Admission System
- . A Guidance System
- . A Student Intern Program
- . A Plan for a School Farm
- . A Plan for an Industrial Arts Teacher Education Program
- . A Plan for an Industry Liaison Program
- . A Plan for Library Services
- . A Plan for Renovation of Classrooms and Technical Shops
- . A Plan for Training Programs and Supervisory Practices for Administrators, Instructional Staff and Support Staff
- . The Development of an Organizational and Administrative Structure
- . Development of a Three Year Secondary Curriculum

A synopsis of each of these documents is included in

Appendix G.

The use that has been made of these documents and recommendations for further use follow.

Vocational Education Advisory Services to the Government of Liberia. The rationale for vocational teacher education stated that only five percent of the vocational teachers are adequately prepared. Since there are no local institutions for training and upgrading vocational teachers, Prairie View proposed the development of competency based teacher education modules. This proposal is unrealistic for Liberia at this point in time. The proposal for external assistance for implementing the industrial arts and vocational/technical teacher training program has apparently not been given serious consideration.

A Plan for Training Program for Instructional Personnel for Booker Washington Institute. The materials in the in-service section have been used with the BWI teachers under the direction of Prairie View. The Curriculum Coordinator could also use some of the materials with new teachers and in the training of secondary students as teachers of Industrial Arts for grades 6-9. The education courses in Agriculture could also make use of some of these materials. The performance-base instruction section is too advanced for where the majority of BWI teachers are in their preparation and professional development. The vocational teachers are struggling with a lack of textbooks, instructional materials and supplies, and a lack of space. BWI teachers cannot be expected to develop competency based instruction following the model in this section until their more basic instructional needs are met. The section on writing performance objectives was used with the teachers as part of their training to write modules. This section can be used for in-service training as background reading. The module development handbook materials were used by Doctors Lovelace and Perazolli in February - March, 1981.

A Plan for Participant Training. The plan is an account of exactly what occurred in the educational programs of the participants while at Prairie View.

A Performance Evaluation System for Instructional Staff. The faculty/staff performance evaluation instrument could be used by department heads as a general evaluation of the teacher. The instructors performance evaluation forms are specific to the vocational areas at BWI. The tasks can be rated by a colleague, department head, or vice principal of instruction. The summary review statements if used would give very little information of value to improving instruction.

The last section includes an evaluation system. The self-evaluation by instructional staff can be used to establish permanent personnel files. The form should also be used by the vice principal of instruction to determine in-service training needs. The student opinion questionnaire could be used to provide data for assessing teacher training needs.

A Plan for Instructional Schedules. The teachers involved in scheduling have not found the plan to be of assistance.

A Plan for Instructional Schedules Teacher Assignments and Student Course Requirements. The instructional schedules were made for the three year program. The form could be used with the four year plan but nothing else is applicable.

An Admission System. The standards are straight forward and should be relatively simple to administer; however, the system breaks down when exceptions to the standards are made by individuals in positions of authority. It is not possible for BWI with its present space and facilities to provide quality instruction for 599 freshman. Approximately 200 of these students were not admitted by the Admission Committee but by fiat. The application for admission is comprehensive and has been accepted by the Guidance Coordinator to whom the registrar reports. The class schedule form will enable the registrar to keep accurate records on each student.

A Guidance System. The guidance system structured for the three year program would be just as workable for the present four year plan. The Guidance Coordinator completed his Master's in guidance and counseling at Prairie View. The forms in this document will be used by the Guidance Coordinator. The materials included at the end of the document can be used as handout materials in counseling students in individual and group sessions. It is recommended that the Guidance Coordinator implement the proposed guidance in-service plan.

A Student Intern Program. The system was implemented by the former Industrial Placement Coordinator who was instrumental in the development of the system. Another person has been appointed to the position. It is hoped that the system will continue to be used. The system could be further improved by involving Department Heads and Teachers in the actual placement, on-site visits and follow-up.

A Plan for a School Farm. The plan has not been used, but one of the teachers has reviewed the plan and thinks it has merit and plans to use parts of it.

A Plan for an Industrial Arts Teacher Education Program. The plan provides for training Industrial Arts teachers for grades 7-9. The plan will be modified to fit into the present four year curriculum and will be implemented in 1983.

A Plan for an Industry Liaison Program. The Board of Governors has representatives from business and industry who serve as a decision making body as well as in an advisory capacity. When BWI is again functioning under the Ministry of Education the Board of Governors will serve only in an advisory capacity. The document may be used by the Principal to outline the activities for the advisory board.

A Plan for Library Services. The plan can serve as a guide for developing a Learning Resources Center. Present plans include a room where the video equipment will be set up and audio visual equipment stored. There is no equipment for a listening center or films or videocassettes for a viewing center.

A Plan for Renovation of Classrooms and Technical Shops. The job descriptions can be used by the Principal in employing personnel in the repair and maintenance area. The recommendations for renovation of classrooms, workshops and campus facilities can be used as a reference in planning and allocating funds and resources.

A Plan for Training Programs and Supervisory Practices for Administrators, Instructional Staff and Support Staff. The outlines for training programs for administrators, instructional staff, support staff and employee training listed the content, method and evaluation. These outlines are general in nature but could be used as the basis for developing training programs; however, it is highly improbable that such programs will be developed and implemented. The section on staffing vocational education programs lists the qualification and certification requirements for vocational teachers. There is no indication from the qualifications of the present teachers that these guidelines have been accepted or used in hiring. It is probably unrealistic to expect the vocational teachers to meet these qualifications given the lack of vocational teacher preparation programs in Liberia.

The Development of an Organizational and Administrative Structure. There were nine organizational charts included in this document. The Principal referred to this document when asked about BWI's administrative structure. The organization chart has the Principal reporting to the Ministry of Education, but at

present the Principal reports to the Board of Governors who report to the Head of State. A new organization chart has been drawn by the writer to include the Vocational Coordinator and Guidance Coordinator positions. The chart has been drawn showing BWI functioning under the Ministry of Education which is the logical placement to give BWI access to the material and human resources of that Ministry. The revised chart is included in Appendix M. The document should be used to apprise all BWI staff of their position on the organization chart, their channel of communication and duties and responsibilities. The Principal cannot be an effective manager so long as the employees bypass their superiors and go directly to him for decisions.

Development of a Three Year Secondary Curriculum. The three year curriculum has been abandoned and BWI is presently operating on a four year plan. Some of the courses and recommendations in the three year plan are reflected in the four year.

The Development of Instructional Programs in Agriculture and Food Processing. The outlines for courses in the three year curriculum that were retained in the four year could be used in Agriculture Plant and Animal Science. Food Processing has not been implemented due to lack of facilities. The competencies would also be useful. Apparently copies of this document were not made available to the teachers at BWI. Insofar as the writer can determine the only copies in the country were left with the USAID Mission in Monrovia. This is true for the following three documents as well.

The Development of Instructional Programs in Building Trades. The outlines and competencies would be useful to the teachers in the Building Trades. The same majors are in the four year curriculum as in the three with one slight change in wording. Cabinetmaking is called Furniture Making in the four year curriculum.

The Development of Instructional Programs in Mechanical Trades. Auto Mechanics, Machining and Diesel Mechanics are offered in the four year curriculum as in the three. The two year and four year mechanical trades curriculum developed by one of the participants in the Prairie View program could draw from the material in this document.

The Development of Instructional Programs in Electricity-Electronics Trades. Air conditioning/Refrigeration has been added to the four year curriculum but was not in the three year. It can be used like the other documents.

BACKGROUND

The agreement for the USAID Vocational Training Project 669-0131 was signed August 17, 1978, for 5.9 million dollars over a five year period. The purpose of the project was to provide equipment and curriculum expertise to make Booker Washington Institute an institution capable of educating and/or training employable mid-level technicians in the areas of agriculture, business, building trades, electrical/electronics, and mechanical/auto mechanics. The Government of Liberia, Ministry of Education entered into a contract with Prairie View A & M, Prairie View, Texas, which was terminated on September 4, 1981. The action was taken by AID "because of differences in priorities between the contractor and the Ministry of Education in carrying out the project." USAID and the Government of Liberia agreed that funds would be made available to provide two short-term vocational education specialists: a vocational education curriculum specialist and a vocational education equipment specialist. The two person team worked with their counterparts at BWI from June 14 to September 11, 1982, to make maximum use of the materials and equipment provided by the Vocational Training Project 669-0131.

CURRICULUM SPECIALIST TERMINATION ACTIVITIES

Review Curriculum Materials Developed by Prairie View A & M

General Findings. Prairie View followed the Government of Liberia guidelines for a three year curriculum with a mix of approximately 60 percent trade training and 40 percent academic studies. Five departments of instruction were

organized to include trade training and related studies. The five departments were Agriculture, Business, Building Trades, Electrical Trades, and Mechanical Trades. The curriculum objectives were to be derived from occupational profiles appearing in the International Standard Classification of Occupations (ISCO) that had been identified and adapted to meet the skill training requirements in Liberia in twelve vocational specialties. The curriculum and instructional program was to be organized in modular form.

Individual modules were prepared by the teachers in each vocational specialty and in English, math and science. The modules produced the first two years of the project were not in a modular format. Some of the modules were written like workbooks, others were a series of handouts, while some were reading materials put together in the form of a booklet. The two Curriculum Consultants obtained by Prairie View, Dr. Bill E. Lovelace and Dr. Frank L. Perazzoli, in February, 1981, developed a module format and assisted BWI and the Prairie View team in developing modules. The modules are purported to be competency based instructional packages. According to the forward in each module the modules were based upon competencies identified and verified through research by the National Council for Vocational Technical Education and Training, World Organization for Rehabilitation and Training (ORT) and Vocational Education Project Papers, Volumes I and II. Each module was to provide learning experiences that integrate theory and application culminating in a criterion referenced

assessment of the student's performance of the specific competency. The modules were to be used by individual students under the direction of the teacher/resource person who was to have been oriented to competency based instruction and how to use the materials. The modules developed prior to the visit of Doctors Lovelace and Perazolli were not put into final form and were not among the materials left with the AID Mission in Monrovia. Some of these workbooks, handout materials, and booklets were made available to the Curriculum Specialist by the teachers. A list of these materials is included in Appendix A. The modules produced following the format suggested by the consultants were put into final form and were made available by AID/Monrovia. A list of these modules is included in Appendix B.

After the termination of the contract on September 4, 1981, the decision was made by BWI to discontinue the use of modules and/or educational materials developed by the Project. The three year curriculum plan was abandoned and the former four year plan was put in place so that the students would be both academically and vocationally trained. The four year plan retained the 60 percent in vocational subjects and 40 percent in academic. The revised four year curriculum plan by vocational area is included in Appendix C. Meetings were held by the Curriculum Specialist with all department heads of all vocational areas followed by meetings with each department head and teaching staff. The results of these meetings are included in the following summaries by vocational area.

Agriculture. Agriculture teachers developed and used handout materials as modules. There were no student

textbooks being used in Agriculture. A list of textbooks has been developed but the majority of the books have not been previewed. Examination copies will be requested in the hope that books selected can be purchased for the 1983 school year. The two modules left by the Prairie View team have not been used in that only four copies are available. The teachers perceive their greatest need to be detailed curriculum guides, teaching plans and student textbooks. The teachers felt that the hand tools were adequate, but often there were problems with maintenance of the tractors and heavy farm equipment. Agriculture four year curriculum is divided into plant science and animal science (Appendix C). In comparing the three year and four year curriculum, it was found that agriculture business and agriculture economics included in the three year curriculum were left out of the four year. Animal husbandry listed in the three year curriculum was divided into separate courses in the four year curriculum; i. e., poultry, swine, and animal science. Crops were combined in the three year curriculum but offered separately in the four year plan. The three year curriculum offered majors in Farm Management and Food Processing which was planned but never materialized, while the four year curriculum has majors in Plant Science and Animal Science. An outline for each course has been developed using the textbooks the teachers used in their classes and the few resources available in the library. Likewise when the teachers prepare their lesson plans they use these same resources for lecture and writing notes on the

chalkboard for the students to copy. In addition to class and field experiences students work six hours per week on the farm that has some 280 acres in production. Students who graduate from agriculture go to work as supervisors on rubber plantations, become agricultural extension agents, teachers in rural schools, or farms on his own or in partnership. The agriculture department has been asked to increase production in order to provide more of the food required to feed BWI boarding students. Increased production will of course require more storage space. Building storage facilities would be an excellent project for the Building Trades students. At least two more brooder houses are needed to raise more chickens and the pig sties need to be expanded to produce more pork. Fish farming could also be added. At present the farm is producing about half of the rice consumed by BWI but that too can be increased by clearing more swamp area for rice.

Business Education. Although Business Education was not included in the Project, the department asked to attend the sessions on module development so they could keep pace with the other vocational areas. The curriculum has two majors, secretarial science and bookkeeping/accounting. An outline for each course is included in the curriculum plan and teachers develop a weekly plan of what they will teach in each class. The teachers endeavor to prepare the students for the Civil Service Exam in the two areas while the expectation is that the students will also be prepared for the National Examination covering academic subjects. The textbooks currently being

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used have copyright dates from 1963 to 1972. The department has about sixty typewriters equally divided between electric and manual models. Only ten of the electric ones are in operating condition. There are thirty calculators, most of which are obsolete and do not work properly. Business Education like all other departments suffers from a lack of materials and equipment. At present, paper is in such short supply that each student is allotted only two sheets per day. Graduates of the Business Education Department seek jobs in the government, banks and private industry.

Building Trades. The first modules developed by Building Trades were in the form of handouts. The modules available in modular format are listed in Appendix B. The teachers who used the modules found that the students were not able to read and comprehend the content of the modules without teacher assistance, the teachers had difficulty working individually with students while maintaining class discipline, and there was an insufficient supply of materials required to complete the modules. Most of the students do not have textbooks for the classes where they are specified. The teachers agreed that their single most difficult problem was the lack of space. The freshman carpentry class has 60 students and the classroom has seating for forty. The practicum portion has to be taught in the shop where carpenters are involved in producing furniture for use by the school. Plans for an annex have been drawn and a Peace Corps Volunteer is applying for Self-Help Funds to build it. This shop would greatly expand the practical training in carpentry. The plumbing area has

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two classes going at once. Because of the noise when one instructor is using the equipment it is difficult for the other instructor to teach theory. In masonry there is a good supply of tools but lack of storage space in the masonry shop makes it necessary to transport the tools some distance across campus which results in a loss of about thirty minutes of class time. Distance, however, could not be the only factor contributing to the apparent lack of practical training. It was pointed out that students in the architectural drafting class are seated two to a drawing table. From observation and talking with teachers, it appears as though theory is emphasized more than practice in most of the building trades. This is in part due to the problems of space and sharing equipment with production employees. The four year curriculum has majors in Drafting, Cabinetmaking, Carpentry, Masonry, and Plumbing. Courses in Building Trades in the three year curriculum not included in the four year curriculum were civil engineering in Architectural Drawing and maintenance courses. The employment opportunities for the graduates were said to be in residential building and furniture making.

Electrical Trades. The three modules left by Prairie View for the Electrical Trades are listed in Appendix B. These modules have not been used. The modules (booklets) developed the first two years were used but the teachers encountered the same problems as other areas with reading comprehension, and not having enough modules for a course so that students could work at their own pace. There were textbooks available one year in electronics but the bookstore has not restocked

them. Textbooks are not being used in electricity. Space is a problem for electronics, particularly with the freshman section of fifty students. Both the electronics and electrical areas need more instructional materials for use in the lab. The electronics lab has been moved and additional electrical wiring has been requested to accommodate all of the equipment. The four year curriculum has three majors; Electricity, Air Conditioning/Refrigeration, and Electronics. Air Conditioning/Refrigeration is being offered in the second semester of 1982. The radio and TV servicing option in the three year curriculum was not included in the four year. In Electricity, welding was included in the three year curriculum but left out in the four year. The teachers in electronics feel they give students basic skills that will allow them to pursue further education in electronics or begin at the entry level in industry. The Electricity area prepares students to work primarily in residential wiring and for power plants.

Mechanical Trades. The modules left by Prairie View have not been used. The first modules were used but a lack of supplies and equipment created problems and the students required a lot of individual help from the teacher. It was felt that the modules could best be used by the teacher more or less like a lesson plan. Student textbooks are not being used. Teachers use whatever texts are available in the library to develop their lesson plans. The classes are approximately 60 percent practical and 40 percent theoretical. As students advance more emphasis is placed on practice. Mechanical trades offers Automotive Mechanics, Diesel Mechanics,

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Auto Body and Fender, and Machine Technology. The Auto Body and Fender shop will be opened the second semester of 1982 as well as Diesel Mechanics. The machinery has been moved into the new machine shop and Diesel Mechanics has been put in an area sectioned off from the old machine shop. The new Mechanical Trades Building has an office in the center that commands a view of both the Welding and Machine Shop. The installation of equipment in the shop is included in the section on equipment installation. The most recent plan for renovation and expansion of space in the vocational area is included in Appendix K.

Summary. The Project Paper 669-0131, Volume I, May, 1978, stipulated that the curriculum and instruction program would be organized and presented in modular form. Individual modules were to present instructional tasks in a logical sequence to enable students to achieve objectives and skill levels identified in the BWI Occupational Profiles included in Volume II of the Project Paper. The Project written in 1978 was following the trend in vocational education in the United States toward competency based education which is dependent upon the technology of systems design and modularization of the instructional program.

It can only be assumed that other curriculum designs and ways to plan instruction were given consideration by the authors of the Project Paper. One would have to, also, assume that the decision to organize and present the curriculum and instruction in modular form was based on an analysis of societal forces that influence curriculum making; e. g., goals, economic

growth and development, make-up of population, family living patterns, tribal culture, and the political scene. The decision was no doubt greatly influenced by the lack of textbooks and other instructional materials and the lack of trained vocational teachers. It appears that the Project Team considered the module to be a self-contained unit of instruction based on complete existing courses. This kind of module would certainly have been the most useful given the lack of instructional sources. The failure of the Project to produce the modules to make up complete courses has left Booker Washington Institute with the same curriculum problem in 1982 that it had in 1978. The Project contributed nothing to alleviating the problem and one might postulate that efforts to develop modules added further confusion and drained the teachers of energy that might have been better utilized in in-service training sessions on how to develop lesson plans, prepare teacher made instructional materials, use a variety of teaching methods, etc.. The few modules that were produced can be used as supplementary course modules tied to content of existing courses but not actually a part of the course itself.

Observe and Analyze Curriculum Patterns Currently in Use

The Four Year Curriculum. The course outlines for the four year curriculum, grades 10 through 13, have been prepared by the BWI teachers. The outlines need to be expanded and reviewed to make sure that the content of the academic courses will prepare students for the West African National

Exam and will, also, meet the content requirements for the trade areas. Detailed outlines are particularly important in the trades to ensure that the students are acquiring the knowledge and skill needed for entry level employment. The Vice Principal for Instruction, acting upon the writers suggestion, is requiring detailed topical outlines for each course in the revised curriculum. The outlines should be reviewed for possible unnecessary duplication of content and to determine content areas that may have been left out or given too little emphasis.

The four year curriculum (Appendix C) is based on 35 credit hours per week, 20 vocational and 15 academic. It would seem to be more reasonable to require students to attend 25 - 30 hours of class a week which would leave time for students to study. Less classroom hours would also allow all students to be involved in projects to make BWI more self sufficient; e.g., production agriculture. Students could also be assigned a job related to their vocational area for a specific number of hours per week. The school would benefit by being able to reduce labor costs as well as food costs while students would derive benefits from on-the-job training.

In reviewing the curriculum (Appendix C) it must be remembered that the curriculum is designed to prepare students for higher education and a vocation. The academic subjects required for entrance into the University of Liberia have been taken into consideration in the math, science, and English requirements.

Recommendations for Assistance

It was the intent of Project 669-0131 to use state-of-the-art technologies in vocational education for upgrading the teaching staff. BWI teachers were to have sufficient training and experience to maintain a 30 hour per week teaching schedule. The average teaching load is still 15 to 20 hours with some instructors teaching as little as one hour per week. There is little evidence that the staff has been upgraded as a result of the project with the exception of the participants that studied at Prairie View A & M. The curriculum that was to have assisted in the upgrading of teaching staff was never developed. The learner centered competency based instructional packages in the various formats have only added to the confusion of unqualified and underqualified teachers.

To meet the needs of these inadequately prepared teachers the scope of work for the development of programmed teaching materials is proposed. The idea for programmed teaching materials emanated from the USAID Improved Efficiency of Learning Project designed for elementary teachers in Liberia, grades 1 - 3. The proposed programmed teaching materials for vocational teachers will not include programmed learning materials like those in the Improved Efficiency of Learning Project. The writer is not aware of any programmed teaching materials that have been developed for use by secondary vocational teachers and cannot offer any research studies to substantiate such an undertaking.

The scope of work for development of programmed teaching materials for vocational teachers is offered as an alternative

to adopting existing curriculum teaching/learning units available from developed nations or continuing to rely on textbooks that either are not purchased by the students, or are not available for purchase. The programmed teaching material is designed to give the content and the teaching method. A model programmed teaching unit is included in Appendix P. The unit was based on the content drawn from the Residential Carpentry unit available from the State Department of Vocational and Technical Education, Stillwater, Oklahoma, USA. The model follows the same format being used by the Improved Efficiency of Learning Project.

No attempt has been made to address the issue of staff for this proposed project; however, it is the opinion of the writer that not only should the technical background of candidates be considered but also their curriculum writing skills as evidenced by past publications.

The following scope of work is presented for consideration to USAID/Monrovia.

SCOPE OF WORK FOR DEVELOPMENT OF PROGRAMMED TEACHING MATERIALS

Overview

Booker Washington Institute has an inadequate supply of qualified vocational teachers and relevant instructional materials. To meet both needs in an efficient and cost effective manner, a programmed teaching system is purposed. The programmed teaching system will be designed to increase the effectiveness of instruction by controlling the behavior of the teacher. The teaching program will include what and how to teach in a form that can be taught in a relatively short period of time to unqualified teachers or teachers from business and industry who have the technical background but no formal teacher training. The programmed teaching materials will be developed for the present four year curriculum in Agriculture, Business Education, Building Trades, Electrical Trades, Home Economics and Mechanical Trades.

The programmed teaching material content will be based on curriculum objectives and vocational skills needed by students to meet stated job requirements. The content will be organized into programmed teaching units by course, and sequenced by increasing complexity and/or prerequisites for learning. Appropriate teaching methods for the content and teacher/student abilities will be included. A teacher training course will be designed to train teachers to use the programmed teaching materials. Tests and measurements to evaluate the programmed teaching materials and teacher/student performance will also be developed.

The proposed development of programmed teaching materials differs from the usual instructional systems development approach

in that it suggests using existing course/teaching outlines to develop programmed teaching units relevant to Liberia. The essential elements of the instructional systems approach, however, will be followed: analysis, design, development, try-out, evaluation, revision, and diffusion.

The plan of action is divided into two phases using the essential elements of the instructional systems approach. The analysis and design elements are in Phase I and development, tryout, evaluation, revision and diffusion are in Phase II. In the analysis stage student characteristics that affect instruction are assessed and educational and training goals established. Available resources and constraints are, also, examined. The design stage makes use of the analysis data to select the course/teaching outlines. During this stage the number and qualifications of people needed for development and implementation of programmed teaching units must be determined. Also, the time required and cost of development and implementation and recurring operational costs must be carefully considered.

In the development stage of Phase II the selected course/teaching outlines will be used to develop programmed teaching units for all courses in the BWI curriculum determined to be relevant to the assessed education and training needs of students in each vocational area. Instructional materials, teacher training programs, achievement and progress tests have to be considered. The tryout, evaluation and revision stages will be carried out in the vocational classrooms and shops at BWI. During the tryout stage data will be collected

that will identify deficiencies that require modification, and evaluation will determine the effectiveness of the programmed teaching materials in meeting curriculum objectives. Then revisions will be made based upon the findings from the collected data. The final stage is diffusion which can be handled by BWI's curriculum coordinator or vice principal in charge of instruction. It will be the responsibility of the BWI vocational teachers to continue to monitor and evaluate the instructional system. The following plan of action is submitted for consideration.

Plan of Action

Phase I

1. Review 4 year curriculum proposed for Agriculture, Business Education, Building Trades, Electrical Trades, Home Economics, and Mechanical Trades at Booker Washington Institute (BWI).
2. Review BWI course outlines, available teaching resource materials, textbooks and constraints on their use.
3. Become familiar with available equipment, shop layouts, level of maintenance, and availability and supply of materials.
4. Analyze characteristics of the learner such as learning aptitudes, cultural and social levels and prior learning that affect how instruction is to be presented and how the conditions of learning are to be organized.
5. Review the potential jobs available to graduates of the vocational programs at BWI to determine educational and

training goals.

6. Collect and review background data on teachers including formal education, work experience and teacher training.
7. Interview all vocational teachers to determine their perception of the kinds of teaching materials that would be most useful to them.
8. Analyze data collected and use to review detailed course/teaching outlines available from U. S. State Departments of Education, U. S. Curriculum Development Centers and the National Network for Curriculum Coordination in Vocational Technical Education (Appendix J).
9. Select course/teaching outlines for the curriculum objectives listed in the four year curriculum plan and the vocational skills required for entry level employment.

Phase II

10. Use the selected course-teaching outlines to develop programmed teaching units for each course in the four year curriculum for each vocational area. The programmed teaching materials will be based on curriculum objectives and vocational skills needed by students. The BWI vocational teachers need to work very closely with the curriculum specialists in developing the programmed teaching units to ensure their relevancy to Liberia. In the units a concerted effort should be made to instruct teachers to require that students engage in a variety of learning tasks. Instructional strategies included must be appropriate for the content, the desired learning

- outcomes, and feasible in the learning environment.
11. Design and develop materials and procedures to train teachers in the effective utilization of the programmed teaching materials.
 12. Conduct teacher training workshops for the vocational teachers on how to use the programmed teaching materials.
 13. Design tests and other evaluative instruments to evaluate student and teacher performance resulting from the use of the programmed teaching materials.
 14. Test the programmed teaching materials in BVI classrooms and shops.
 15. Revise the programmed teaching materials as a result of new knowledge gained from the tests.
 16. Set up the process to duplicate and distribute the programmed teaching units and a system for continued monitoring and evaluation of the materials.

Additional Tasks Accomplished by the Curriculum Specialist

In addition to the tasks outlined in the Three Month Termination Project, the curriculum Specialist completed the following tasks:

- . Reviewed the sub-system documents developed by Prairie View and prepared a summary of each with recommendations for use.
- . Developed an in-service teacher education program for BWI to be implemented by the Vice Principal for Instruction.
- . Developed the curriculum plan for training Industrial Arts teachers for grades 6-9.
- . Developed a Scope of Work for Programmed Teaching materials for the vocational-technical programs at BWI.
- . Wrote a sample programmed teaching lesson on hand tools used in carpentry.
- . Revised the organization chart for BWI to include the vocational and guidance coordinator positions and to place BWI under the Ministry of Education with the Board of Governors as advisors.
- . Collected resumes on all BWI teachers to be filed in the office of the Vice Principal for Instruction.
- . Served as a consultant to the Vice Principal for Instruction on administrative problems and procedures.
- . Developed an outline for BWI Administrative and Operations Manual to be completed under the direction of the Vice Principal for Instruction.

EQUIPMENT SPECIALIST TERMINATION ACTIVITIES

Review BWI Plans for Shop Operation

The specialist and his counterpart devised the following plan for the shops:

- . Move Mechanical Trades into the new building.
- . Move Diesel Mechanics to the old machine shop. Make two classrooms, tool room and rest rooms in the remainder of the building.
- . Move welding to the new building.
- . Convert old welding shop into air conditioning/refrigeration classroom and shop.
- . Renovation of automotive shop including sectioning off areas for another classroom and a tool room.
- . Renovation of electronics building to enlarge the laboratory. Install rogue bars and additional electrical outlets for the equipment.
- . Renovate plumbing shop to provide space for two classes to be taught simultaneously.
- . Enclose the areas between the curriculum building and building trades and building trades and maintenance to provide more space for carpentry and masonry.
- . Remodel curriculum building to provide classroom space.

All but the last three items were accomplished during the contract. The plumbing shop renovation can be done by BWI maintenance personnel. The annexes to provide space for carpentry and masonry require additional funds. A proposal will be submitted for Self Help Funds by Peace Corps. The curriculum building was never completed by the contractor and until the dispute is settled remodeling into classrooms will be delayed.

Installation of Machines

The following machines were installed in the machine shop during the three month contract:

- . (1) Kalamazoo Startrite Metal Bandsaw, 20 RWF With Ideal Welding Unit Attached
- . (1) Kalamazoo Startrite Metal Bandsaw 20-R-10 With Ideal Welding Unit Attached
- . (1) Jet Milling Machine JVM-942F
- . (1) Greaves Cincinnati Milling Machine
- . (1) Hommel Milling Machine 5303 Type SH4
- . (1) Gould & Eberhardt Shaper 14 Plain Tool Room Universal
- . (1) Maskin - Aktiebolaget Thule Shaper S-22-T
- . (1) Burke Milling Machine Model B
- . (1) Keller Heavy Duty Reciprocating Metal Saw 24"
- . (1) Dake Hydraulic Press 125 Ton
- . (1) Flott Drill Press Type 23 ST
- . (1) Rockwell Drill Press Series 70-6X0
- . (2) Rockwell/Delta 20" Drill Press Series 70-6X0
- . (1) Rockwell/Delta Drill Press Catalog Number 15-665
- . (1) Logan Speed Lathe 12" Swing 48" Bed Length
- . (1) South Bend Speed Lathe 12" Swing 48" Bed Length
- . (2) Rockwell 6" Tool Grinder 1/2 H. P.
- . (1) K. O. Lee Manually Operated Surface Grinder
- . (1) Lucifer Heat Treat Furnace Model HDL, 8012E
Maximum Temperature 2300 degrees Fahrenheit,
21.5 KW, 97.0 AMPS, Volts 230-1-60
- . (6) South Bend Precision Lathe, Bed Length 60",
Swing 13"
- . (1) South Bend Quick Change Gear Lathe, 14 1/2"- 16"
Swing, Bed Length 7 Feet

- . (1) Harrison M-300 Gear Lathe 13" Swing With Taper Attachment
- . (1) Harrison M-300 Gear Lathe 13" Swing With Copying Attachment
- . (1) Harrison Engine Lathe Model 600 17" Swing
- . (1) Meuser 18" Swing Engine Lathe
- . (3) Boxford ME10 Lathes 10" Swing, 40" Bed With Taper Attachments

The machines installed in the automotive shop were:

- . (1) Honing Machine, Sunner Model LLB1700
- . (1) Tire Changer, Coates 10-10
- . (1) Drum and Rotor Lathe, AMMCO Model 4000
- . (1) Steam Cleaner, 760-C Homestead
- . (2) Valve Refacer & Stem Grinder, Sioux
- . (1) Wheel Balancer Bear 500 Dynamic
- . (1) Weaver Twin Frame Hydraulic Lift
- . (1) Engine Analyzer, Allen Model 16-190 12" Solid State, 16000 Series

The next two pieces of equipment need no installation for use in the Refrigeration/Air Conditioning program.

- . (1) Commercial Refrigeration Training Unit, Model 9501 Serial Number 899
- . (2) Basic Refrigeration Training Units, Model 9240 Broadhead-Garrett

The following cafeteria equipment has been installed:

- . (2) Groen Rice Steamers, Model Number 104599
- . (2) Bladgett Ovens, Type EF 111
- . (3) Vulcan-Hart Electric Stoves, F-60F, Serial Number 80116608

Shop layouts are included in Appendix N.

Recommendations for Improving the Utilization of Equipment and Facilities

The following recommendations are made to improve the utilization of equipment and facilities:

- . Install safety devices on all woodworking equipment.
- . Install an exhaust system in woodworking and paint shops.
- . Build tool cribs and store rooms for tools in all shops.
- . Provide atmospheric control for electronics shop equipment and treat equipment with protective coating.
- . Repair transmitter in electronics shop.
- . Enforce rule that only authorized personnel and students enrolled in the class are allowed in the shops. Identification badges for students by trade would be helpful in enforcing the rule.
- . Require students to wear/use appropriate safety equipment and follow good safety measures in all shops.
- . Install an overhead beam in the automotive shop for use in the removal of motors.
- . Install a pit with adequate drain in outside area of automotive shop.
- . Renovate body shop and install lights for drying of paint.
- . Utilize all welding equipment including spot welders, wire feed inert gas welder, acetylene generator and diesel powered welders.
- . Provide an adequate budget for purchase of consumable materials and supplies as well as replacement of tools and equipment.
- . Set up a central warehouse for the trade shops. Appoint a manager with sufficient qualified staff to purchase equipment, parts and supplies, repair and maintain equipment and inventory of supplies and equipment.
- . Further renovation of the automotive shop to include a roof over the outside work area.

Liberia Vocational Training Project (669-0131) Termination
Activities Project Conclusions and Recommendations

The curriculum and equipment specialists' responsibilities outlined in the Project document were the major focus in the report. However, these responsibilities could not be met without an indepth study of the work done under Project 669-0131 by Prairie View A & M and the social, political environment in which Booker Washington Institute operates. The curriculum specialist and writer has endeavored to sift through the objective and subjective data and report findings in an objective and constructive manner.

The accomplishments of the curriculum and equipment specialists have been addressed in this document. Recommendations where appropriate have been made in the body of the report. The following additional recommendations are directed to the Ministry of Education, administrators and staff of BWI:

- . Develop an administrative manual that shows the organization chart, defines the responsibilities and functions of the different positions and the communication lines among positions, and establishes BWI operating policies and procedures. (See Appendix S)
- . Require teachers to sign contracts specifying number of days they are required to teach, the number of class hours per week, salary and fringe benefits.
- . Select and purchase textbooks for vocational-technical areas and institute a loan system.
- . Increase enrollment in agriculture in view of the fact that it is the only sector of the economy registering any growth.
- . Implement the in-service teacher education program included in Appendix O.
- . Implement the Industrial Arts Teacher Education Program included in Appendix Q.

- . Involve vocational teachers in the Internship Program. The teachers would work with the employers who provide on-the-job training to place students, make follow-up visits and evaluate student performance and experience. The teachers would be able to keep up with developments in business and industry through these contacts and could update their curriculum to meet the changing needs.
- . Draw a sample of BWI graduates from the last five years and do a follow-up study to determine how many of the graduates are employed in the vocational area for which they were trained.
- . Develop a system for cleaning and maintaining the shops and equipment on a regular basis.
- . Devise an inventory system for equipment and tools.
- . Develop repair and maintenance records for all equipment and set up a maintenance/repair schedule.
- . Install a work station rotation system in the shops where appropriate.
- . Purchase the parts needed to put the equipment into operation listed in Appendix R.
- . Select and use an aptitude test to assign students to vocational specialty.

REFERENCES

Liberia Country Development Strategy Statement, FY 1984,
USAID Field Mission, March 1982.

Liberia Education and Training Review Memorandum, Document of
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Morgan, Robert M. and David S. Bushnell, "Designing an Organic
Curriculum" in National Business Education Quarterly,
Vol. 35, No. 3, March 1967, p. 11.

Vocational Training Project Paper 669-0131, Volumes I & II,
May 23, 1978.

APPENDIX A

APPENDIX A

FIRST MODULES DEVELOPED BY BWI TEACHERS

BUSINESS

General Office Procedures

Understand the Function of Today's Modern Office
 What Office Workers Basically Do
 Where You May Find Office Jobs

General Business

Be Able to Relate Economic Theories to Business
 Personal Financial Affairs

Bookkeeping/Accounting

Record Bookkeeping
 Date of a Starting Merchandising Business

Physics

Series and Parallel Circuits
 Resistivity
 Magnetism
 Electromagnetism
 Wave Motion
 Heating Effect of Electric Current

Mathematics

Evaluation of Algebraic Expressions
 Simple and Fractional Equations
 Reading Problems
 Transposition of Formulae
 Logarithms
 Linear Inequality in One Variable
 Angles and Straight Lines
 Use Logarithms to Solve Complicated Problems

Electricity

Electrical Calculations
 Inductive Reactance Problems
 Capacitive Reactance Problems
 AC Circuits Power Factor Problems
 AC Circuit Motor Circuit Problems
 Alternators (AC Generators)
 Rotating AC Machinery
 Electrical Measuring Instrument
 Reading Meter Scales
 Sources of Electricity
 Magnets
 Primary and Secondary Coils

MASONRY

Spreading Mortar and Laying Brick
Personal and Job Safety
Preliminary Considerations
Hand Tools
Materials - Cement

CABINETMAKING

The Importance of Wood
The Classification of Wood
Sawing of Lumber
Seasoning of Lumber
Grading Lumber
Plywood
Calculating Board Measure
The Cost of Lumber
Planning Your Work
Measuring Rules
Layout Tools

CHEMISTRY

Matter and Energy
Matter and Its Changes
Measurements
Atomic Structure
Electron Configuration
Chemical Bonds
Chemical Composition
Chemical Equation

ENGLISH

Following and Writing Directions
Reading
Basic Reference Skills
Nouns, Pronouns and Verbs
Adjectives, Adverbs and Prepositions
Conjunctions
Sentence Fragments
Subject-Verb Agreement
Commonly Misspelled Words
Confusing Word Parts
Capitalization and Punctuation
Mechanics and Styles
Principles of Good Speaking
Types of Speeches
Composition: Planning and Writing Paragraphs
Composition: Varieties of English
Composition: Letter Writing
Grammar: Word Parts
Composition: Writing Reports
Composition: Newspaper and Magazines

ENGLISH Continued

Reading: Context Clues
Spelling: Confusing Word Pairs
Spelling: Commonly Misspelled Words
Technical Reporting
Basic Reference Skills
Principles of Good Speaking
Kinds of Speeches
Listening and Comprehension
Comparison - Contrast Essays
How to Develop an Outline

MECHANICAL TRADES

Micrometer
Solid Try Square
Funnel Project
Toolbox Project
Metals Used in the Machine Shop

ELECTRONICS

Capacitance in Electrical Circuits and Tuned Circuits:
RCL Networks
Circuits and Power
Magnetism
Electric Motors & Instruments and Measurements

APPENDIX B

APPENDIX B
MODULES IN CORRECT FORMAT

AGRICULTURE

Layout a Garden Plot as per Worksheet Specifications
Demonstrate Knowledge of the History of Agriculture

BUILDING TRADES

Carpentry - Use Proper Hand Sanding
Architectural Drafting - Skill in Preparing
Sectional Drawings
Skill in Identifying Roof
Framing Construction

Masonry - Spread a Uniform Bed of Mortar
Plumbing - Joining Pipes and Fittings

ELECTRICAL TRADES

Electronics - Operation of Tune Plate - Tune Grid
Oscillators

Electricity - Application of Ohm's and Kirchoff's
Laws to Simple Circuits
Apply Ohm's Law to Solve Simple Electrical
Network Problems

MECHANICAL TRADES

Diesel - Test Engine Compression
Automotive Mechanics - Fit Piston Ring to Piston
Mechanics - How to Read a Micrometer

MODULES TO BE COMPLETED BY TRADE

Agriculture	175
Building Trades	274
Electrical Trades	209
Mechanical Trades	300

Source: Quarterly Report, Project 669-0131, April 1981.

APPENDIX C

AGRICULTURE DEPARTMENTFRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Animal Science	11	4	Animal Science	12	4
Plant Science	11	4	Plant Science	12	4
Soil Science	11	4	Soil Science	12	4
Mechanics	11	4	Mechanics	12	4
Management	11	4	Management	12	4
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Mathematics	11	4	Biology II	12	4
Biology I	11	4	Algebra	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Animal Science	21	6	Animal Science	22	6
Plant Science	21	6	Plant Science	22	6
Soil Science	21	4	Soil Science	22	4
Management	21	4	Management	22	4
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Biology III	21	4	Biology IV	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

AGRICULTURE DEPARTMENT - PLANT MAJORJUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Rubber	31	6	Rubber	32	6
Oil Palm & Coconuts	31	3	Oil Palm & Coconuts	32	3
Rice	31	6	Rice	32	6
Mechanics	31	3	Mechanics	32	3
Education	31	2	Education	32	2
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Chemistry I A	31	4	Chemistry II A	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Vegetables	41	6	Vegetables	42	6
Tuber & Roots	41	6	Coffee & Cocoa	42	6
Fruits	41	6	Fruits	42	6
Education	41	2	Education	42	2
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Physics I	41	4	Physics II	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

AGRICULTURE DEPARTMENT - ANIMAL SCIENCEJUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Poultry	31	6	Poultry	32	6
Swine Production	31	6	Swine Production	32	6
Small Ruminants	31	6	Small Ruminants	32	6
Education	31	2	Education	32	2
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Chemistry I A	31	4	Chemistry I A	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Beef Production	41	7	Beef Production	42	7
Pasture Development	41	8	Mechanics	42	3
Mechanics	41	3	Forage Production	42	8
Education	41	2	Education	42	2
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Physics I	41	4	Physics II	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

FRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Shorthand	11	6	Shorthand	12	6
Typing	11	5	Typing	12	5
Business English	11	3	Business English	12	3
Office Procedures	11	3	Office Procedures	12	3
Business Math	11	3	Business Math	12	3
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Math	11	4	Algebra	12	4
Biology I	11	4	Biology II	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Shorthand	21	6	Shorthand	22	6
Typing	21	5	Typing	22	5
Business Math	21	3	Business Math	22	3
Office Procedures	21	3	Office Procedures	22	3
Business English	21	3	Business English	22	3
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Biology III	21	4	Biology IV	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

JUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Dictation Transcription	31	6	Dictation Transcription	32	6
Typing	31	5	Typing	32	5
Business English	31	4	Business English	32	4
Secretarial A/C	31	5	Secretarial A/C	32	5
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Chemistry I G	31	4	Chemistry II G	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Dictation Transcription	41	6	Dictation Transcription	42	6
Typing	41	5	Typing	42	5
Business Math	41	3	Business Math	42	3
Office Procedures	41	3	Office Procedures	42	3
Business English	41	3	Business English	42	3
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Physics I	41	4	Physics II	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

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BUSINESS EDUCATION - BOOKKEEPING

FRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Bookkeeping	11	5	Bookkeeping	12	5
Business Math	11	5	Business Math	12	5
Typing	11	4	Typing	12	4
Office Procedures	11	3	Office Procedures	12	3
Business English	11	3	Business English	12	2
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Math	11	4	Algebra	12	4
Biology I	11	4	Biology II	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Bookkeeping	21	5	Bookkeeping	22	5
Business English	21	3	Business English	22	3
Typing	21	4	Typing	22	4
Office Procedures	21	3	Office Procedures	22	3
Business Math	21	5	Business Math	22	5
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Biology III	21	4	Biology IV	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

JUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Bookkeeping	31	5	Bookkeeping	32	5
Typing	31	5	Typing	32	5
General Business	31	4	General Business	32	4
Office Machines	31	3	Office Machines	32	3
Business English	31	3	Business English	32	3
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Chemistry I G	31	4	Chemistry II G	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Bookkeeping	41	5	Bookkeeping	42	5
Typing	41	5	Typing	42	5
Business English	41	5	Business English	42	5
Business Math	41	5	Business Math	42	5
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Physics I	41	4	Physics II	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1

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BUILDING TRADES - GENERAL COURSESFRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
General Woodwork	11	8	General Woodwork	12	8
Masonry	11	4	Masonry	12	4
Mechanical Drawing	11	2	Mechanical Drawing	12	2
Plumbing	11	4	Plumbing	12	4
Trade Maths	11	2	Trade Maths	12	2
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Math	11	4	Algebra	12	4
Biology I	11	4	Biology II	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
General Woodwork	21	4	General Woodwork	22	4
Masonry	21	4	Masonry	22	4
Trade Drawing	21	2	Trade Drawing	22	2
Trade Maths	21	2	Trade Maths	22	2
Plumbing	21	4	Plumbing	22	4
Painting & Decorating	21	4	Painting & Decorating	22	4
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Physics I	21	4	Physics II	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

BUILDING TRADES - MASONRY

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Masonry	31	8	Masonry	32	8
Trade Drawing	31	2	Trade Drawing	32	2
Estimating	31	2	Estimating	32	2
Surveying	31	4	Surveying	32	4
Painting & Decorating	31	4	Painting & Decorating	32	2
English	31	4	Basic House Wiring	32	2
World History	31	2	English	32	4
Geometry I	31	4	World History	32	2
Physics III	31	4	Geometry II	32	4
R.O.T.C.	31	1	Physics IV	32	4
		<u>35</u>	R.O.T.C.	32	<u>1</u>
					<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Masonry	41	8	Masonry	42	8
Trade Drawing	41	4	Trade Drawing	42	4
Estimating	41	2	Estimating	42	2
Surveying	41	4	Surveying	42	4
Basic House Wiring	41	2	Management	42	2
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Chemistry I BT	41	4	Chemistry II BT	42	4
R.O.T.C.	41	1	R.O.T.C.	42	<u>1</u>
		<u>35</u>			<u>35</u>

BUILDING TRADES - FURNITURE MAKINGJUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Techniques of Furniture Construction	31	8	Techniques of Furniture Construction	32	4
Trade Drawing	31	4	Trade Drawing	32	4
Estimating	31	4	Estimating	32	4
Painting & Decorating	31	4	Painting & Decorating	32	2
English	31	4	Basic House Wiring	32	2
World History	31	2	Surveying	32	4
Geometry I	31	4	English	32	4
Physics III	31	4	World History	32	2
R.O.T.C.	31	1	Geometry II	32	4
		<u>35</u>	Physics IV	32	4
			R.O.T.C.	32	1
					<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Techniques of Furniture Construction	41	8	Techniques of Furniture Construction	42	8
Trade Drawing	41	4	Trade Drawing	42	4
Estimating	41	4	Estimating	42	4
Basic House Wiring	41	2	Management	42	2
Surveying	41	2	Surveying	42	2
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Chemistry I BT	41	4	Chemistry II BT	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

BUILDING TRADES - CARPENTRY AND JOINERY

FRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Carpentry & Joinery	31	8	Carpentry & Joinery	32	8
Trade Drawing	31	4	Trade Drawing	32	4
Estimating	31	2	Estimating	32	2
Surveying	31	4	Surveying	32	2
Painting & Decorating	31	2	Painting & Decorating	32	2
English	31	4	Basic House Wiring	32	2
World History	31	2	English	32	4
Geometry I	31	4	World History	32	2
Physics III	31	4	Geometry II	32	4
R.O.T.C.	31	1	Physics IV	32	4
		<u>35</u>	R.O.T.C.	32	<u>1</u>
					35

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Carpentry & Joinery	41	8	Carpentry & Joinery	42	8
Trade Drawing	41	2	Trade Drawing	42	4
Estimating	41	4	Estimating	42	2
Basic House Wiring	41	2	Surveying	42	4
Surveying	41	4	Management	42	2
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Chemistry I BT	41	4	Chemistry II BT	42	4
R.O.T.C.	41	1	R.O.T.C.	42	<u>1</u>
		<u>35</u>			35

BUILDING TRADES - CARPENTRY AND JOINERY

JUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Carpentry & Joinery	31	8	Carpentry & Joinery	32	8
Trade Drawing	31	4	Trade Drawing	32	4
Estimating	31	2	Estimating	32	2
Surveying	31	4	Surveying	32	2
Painting & Decorating	31	2	Painting & Decorating	32	2
English	31	4	Basic House Wiring	32	2
World History	31	2	English	32	4
Geometry I	31	4	World History	32	2
Physics III	31	4	Geometry II	32	4
R.O.T.C.	31	1	Physics IV	32	4
		<u>35</u>	R.O.T.C.	32	<u>1</u>
					<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Carpentry & Joinery	41	8	Carpentry & Joinery	42	8
Trade Drawing	41	2	Trade Drawing	42	4
Estimating	41	4	Estimating	42	2
Basic House Wiring	41	2	Surveying	42	4
Surveying	41	4	Management	42	2
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Chemistry I BT	41	4	Chemistry II BT	42	4
R.O.T.C.	41	1	R.O.T.C.	42	<u>1</u>
		<u>35</u>			<u>35</u>

BUILDING TRADES - PLUMBINGJUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Plumbing Techniques	31	8	Plumbing Techniques	32	8
Trade Drawing	31	4	Trade Drawing	32	2
Welding	31	4	Welding	32	4
Surveying	31	2	Painting	32	2
Painting	31	2	Surveying	32	2
English	31	4	Basic House Wiring	32	2
World History	31	2	English	32	4
Geometry I	31	4	World History	32	2
Physics III	31	4	Geometry II	32	4
R.O.T.C.	31	1	Physics IV	32	4
		<u>35</u>	R.O.T.C.	32	<u>1</u>
					<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Plumbing Techniques	41	10	Plumbing Techniques	42	10
Estimating	41	2	Estimating	42	2
Trade Drawing	41	2	Surveying	42	4
Surveying	41	4	Management	42	2
Basic House Wiring	41	2	Trade Drawing	42	2
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Chemistry I BT	41	4	Chemistry II BT	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

BUILDING TRADES - ARCHITECTURAL DRAFTING

FRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Mechanical Drawing	11	20	Mechanical Drawing	12	4
English	11	4	Architectural Drawing	12	14
African History	11	2	Trade Math	12	2
General Mathematics	11	4	English	12	4
Biology I	11	4	West African History	12	2
R.O.T.C.	11	1	Algebra	12	4
		<u>35</u>	Biology II	12	4
			R.O.T.C.	12	1
					<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Architectural Drafting	21	18	Architectural Drafting	22	18
Trade Math	21	2	Trade Math	22	2
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Physics	21	4	Physics	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

JUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Architectural Drafting	31	16	Architectural Drafting	32	16
Estimating	31	2	Surveying	32	2
Surveying	31	2	Estimating	32	2
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Physics III	31	4	Physics IV	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Architectural Drafting	41	12	Architectural Drafting	42	16
Surveying	41	4	Surveying	42	4
Estimating	41	4	Management	42	2
English	41	4	English	42	4
Economics	41	2	Estimating	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Chemistry I	41	4	Economics	42	2
R.O.T.C.	41	1	Chemistry II	42	4
		<u>35</u>	R.O.T.C.	42	1
					<u>35</u>

ELECTRICAL TRADES - GENERAL COURSES

FRESHMAN

<u>FIRST SEMESTER</u>			<u>SECOND SEMESTER</u>		
COURSE NO.	CREDIT HOURS		COURSE NO.	CREDIT HOURS	
Electrical Technology I	11	3	Electrical Technology I	12	3
Trade Math I	11	3	Trade Math I	12	3
Residential Wiring/Maint.	11	8	Residential Wiring/Maint.	12	8
Trade Drawing I	11	4	Trade Drawing I	12	4
Mechanical Drawing I	11	2	Mechanical Drawing I	12	2
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Math	11	4	Algebra	12	4
Physics I	11	4	Physics	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>			<u>SECOND SEMESTER</u>		
COURSE NO.	CREDIT HOURS		COURSE NO.	CREDIT HOURS	
Electrical Technology II	21	2	Electrical Technology II	22	2
Trade Math II	21	2	Trade Math II	22	2
Residential Wiring/Maint.	21	12	Residential Wiring/Maint.	22	12
Trade Drawing II	21	2	Trade Drawing II	22	2
Mechanical Drawing II	21	2	Mechanical Drawing II	22	2
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Physics III	21	4	Physics IV	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

JUNIOR

ELECTRICITY MAJOR

<u>FIRST SEMESTER</u>			<u>SECOND SEMESTER</u>		
COURSE NO.	CREDIT HOURS		COURSE NO.	CREDIT HOURS	
Electrical Technology III	31	2	Electrical Technology III	32	2
Trade Math	31	2	Trade Math	32	2
Trade Drawing III	31	4	Trade Drawing III	32	4
Industrial Wiring/Maint.	31	12	Industrial Wiring/Maint.	32	12
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Chemistry I E	31	4	Chemistry II G	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>			<u>SECOND SEMESTER</u>		
COURSE NO.	CREDIT HOURS		COURSE NO.	CREDIT HOURS	
Electrical Technology	41	2	Electrical Technology IV	42	2
Trade Math IV	41	2	Trade Math IV	42	2
Trade Drawing IV	41	4	Trade Drawing IV	42	4
Industrial Wiring/Maint.	41	12	Industrial Wiring/Maint.	42	12
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra and Trigonometry	42	4
Biology I	41	4	Biology II	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

ELECTRICAL TRADES - AIR CONDITIONING/REFRIGERATOR
REFRIGERATION MAJOR

JUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Air Conditioning/ Refrigeration Technology	31	3	Air Conditioning/ Refrigeration Technology	32	3
Trade Math III	31	2	Trade Math III	32	2
Practical I	31	15	Practical I	32	15
English	31	4	English	31	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Chemistry I E	31	4	Chemistry II E	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Air Conditioning/ Refrigeration Technology II	41	3	Air Conditioning/ Refrigeration Technology II	42	3
Trade Math IV	41	2	Trade Math IV	42	2
Practical II	41	15	Practical II	42	15
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Biology I	41	4	Biology II	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

ELECTRICAL TRADES - ELECTRONICS

FRESHMAN

<u>FIRST SEMESTER</u>			<u>SECOND SEMESTER</u>		
	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>		<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Basic Electricity	11	10	Basic Electricity	12	10
Trade Math	11	4	Trade Math	12	4
Mechanical Drawing	11	2	Mechanical Drawing	12	2
Practical	11	4	Practical	12	4
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Math	11	4	Algebra	12	4
Physics I	11	4	Physics II	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>			<u>SECOND SEMESTER</u>		
	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>		<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Basic Electronics	21	6	Basic Electronics	22	6
Communications	21	6	Communications	22	6
Trade Math	21	4	Trade Math	22	4
Practical	21	4	Practical	22	4
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Physics III	21	4	Physics IV	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

JUNIORS

<u>FIRST SEMESTER</u>			<u>SECOND SEMESTER</u>		
	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>		<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Electronic Circuit	31	4	Electronic Circuit	32	4
Theory	31	5	Theory	32	5
Communications	31	4	Communications	32	4
Computer Electronics	31	3	Computer Electronics	32	3
Trade Math	31	4	Trade Math	32	4
Practical	31	4	Practical	32	4
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Chemistry I E	31	4	Chemistry II E	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>			<u>SECOND SEMESTER</u>		
	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>		<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Electronic Circuit/Theory	41	3	Electronic Circuit/Theory	42	3
Communications	41	5	Communications	42	5
Computer Electronics	41	5	Computer Electronics	42	5
Trade Math	41	2	Trade Math	42	2
Practical	41	5	Practical	42	5
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Biology I	41	4	Biology III	42	1
R.O.T.C.	41	1			<u>1</u>
		<u>35</u>			<u>35</u>

MECHANICAL TRADES - MACHINE TECHNOLOGY

FRESHMAN

FIRST SEMESTER

	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Machine Technology I		
Bench Metal	11	16
Mechanical Drawing I	11	4
English	11	4
African History	11	2
General Math	11	4
Biology I	11	4
R.O.T.C.	11	1
		<u>35</u>

SECOND SEMESTER

	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Machine Technology II		
Sheet Metal	12	16
Mechanical Drawing II	12	4
English	12	4
West African History	12	2
Algebra	12	4
Biology II	12	4
R.O.T.C.	12	1
		<u>35</u>

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SOPHOMORE

FIRST SEMESTER

	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Machine Technology III		
Oxy-acetylene Welding	21	16
Mechanical Drafting I	21	4
English	21	4
World Geography	21	2
Algebra II	21	4
Physics I	21	4
R.O.T.C.	21	1
		<u>35</u>

SECOND SEMESTER

	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Machine Technology IV		
Welding	22	12
Introduction to Shop Math	22	4
Mechanical Drafting II	22	4
English	22	4
West African Geography	22	2
Algebra III	22	4
Physics II	22	4
R.O.T.C.	22	1
		<u>35</u>

JUNIOR

FIRST SEMESTER

	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Machine Technology V		
Machine Shop	31	12
Advanced Mechanical Design	31	4
Shop Mathematics	31	4
English	31	4
World History	31	2
Geometry I	31	4
Physics III	31	4
R.O.T.C.	31	1
		<u>35</u>

SECOND SEMESTER

	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Machine Technology VI		
Essential Machinery	32	16
Tool & Die Design	32	4
English	32	4
World History	32	2
Geometry II	32	4
Physics IV	32	4
R.O.T.C.	32	1
		<u>35</u>

SENIOR

FIRST SEMESTER

	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Machine Technology VII		
Advanced Machine Tool Practice	41	14
Preventive Maintenance	41	6
English	41	4
Economics	41	2
Algebra & Trigonometry	41	4
Chemistry I M	41	4
R.O.T.C.	41	1
		<u>35</u>

SECOND SEMESTER

	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Machine Technology VIII		
Manufacturing		
Material Process	42	12
Industrial Management	42	4
English	42	4
Economics	42	2
Algebra & Trigonometry	42	4
Chemistry II M	42	4
R.O.T.C.	42	1
		<u>35</u>

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MECHANICAL TRADES - AUTOMOTIVE

FRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Auto Technology I	11	16	Auto Technology II	12	16
Mechanical Drawing I	11	4	Mechanical Drawing II	12	4
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Math	11	4	Algebra	12	1
Biology I	11	4	Biology II	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Welding I Automotive	21	6	Welding II Automotive	22	4
Power Training	21	10	Electrical System	22	12
Mechanical Drafting	21	4	Mechanical Drafting	22	4
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Physics I	21	4	Physics II	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

JUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Basic Automotive Trouble Shooting	31	10	Advanced Automotive Trouble Shooting & Diagnosis	32	10
Basic Engine Tune-up	31	5	Front End Geometry	32	5
Basic Driver Education	31	5	Advanced Driver Education	32	5
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Physics III	31	4	Physics IV	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Engine Overhauling	41	6	Engine Overhauling	42	14
Transmission Overhauling	41	8	Shop Management & Estimating	42	6
Shop Management	41	6	English	42	4
English	41	4	Economics	42	2
Economics	41	2	Algebra & Trigonometry	42	4
Algebra & Trigonometry	41	4	Chemistry II M	42	4
Chemistry I M	41	4	R.O.T.C.	42	1
R.O.T.C.	41	1			<u>35</u>
		<u>35</u>			<u>35</u>

MECHANICAL TRADES - AUTO BODY AND FENDER

FRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Auto Body & Fender Technology I	11	16	Auto Body & Fender Technology II	12	16
Mechanical Drawing I	11	4	Mechanical Drawing II	12	4
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Math	11	4	Algebra	12	4
Biology I	11	4	Biology II	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Auto Body & Fender Technology II	21	16	Auto Body & Fender Technology II	22	16
Mechanical Drafting III	21	4	Mechanical Drafting IV	22	4
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Physics I	21	4	Physics II	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

JUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Auto Body & Fender Technology III	31	20	Auto Body & Fender Technology III	32	20
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Physics III	31	4	Physics IV	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Auto Body & Fender Technology IV	41	20	Auto Body & Fender Technology IV	42	20
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Chemistry I M	41	4	Chemistry II M	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

FRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Auto Technology I	11	16	Auto Technology II	12	16
Mechanical Drawing I	11	4	Mechanical Drawing II	12	4
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Math	11	4	Algebra	12	1
Biology I	11	4	Biology II	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Welding I	21	6	Welding II	22	4
Automotive			Automotive		
Power Training	21	10	Electrical System	22	12
Mechanical Drafting	21	4	Mechanical Drafting	22	4
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Physics I	21	4	Physics II	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

JUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Diesel Engine			Diesel Engine Trouble		
Operation & Principles	31	14	Shooting & Diagnosis	32	14
Diesel Fuel Injection	31	6	Diesel Fuel System	32	6
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Physics III	31	4	Physics IV	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Diesel Engine			Engine Overhauling	42	14
Overhaul & Tune-up	41	14	Shop Management		
Shop Management	41	6	& Estimation	42	6
English	41	4	English	42	4
Economics	41	2	Economics	42	2
Algebra & Trigonometry	41	4	Algebra & Trigonometry	42	4
Chemistry I M	41	4	Chemistry II M	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

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APPENDIX D

BWI ENROLLMENT BY SEX AND VOCATIONAL AREA

	<u>FRESHMAN</u>		<u>JUNIOR</u>		<u>SENIOR</u>	
	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>	<u>M</u>	<u>F</u>
Agriculture	77	12	18	14	11	14
Automotive	39	1	23	1	14	1
Bookkeeping	42	17	15	5		5
Carpentry	41		7		10	
Drafting	37	8	25	5	13	14
Electricity	35	2	22	1	15	
Electronics	48	2	20	1	11	8
Home Economics		39				
Machinery	43	1	14	1	18	
Masonry	40		9		15	
Plumbing	49	1	4		21	1
Secretarial Science	6	51		22		17

APPENDIX E

APPENDIX E

VOCATIONAL TEACHER QUALIFICATIONS

Agriculture

Four agriculture teachers hold Bachelors Degrees, one a Masters and one teacher has two years of post secondary training. All the teachers stated they had on-the-job work experience in agriculture. The length of time worked at BWI ranged from six months to 13 years. The number of years of teaching experience was the same, for 6 months to 13 years. All but one of the teachers is Liberian.

Building Trades

In building trades two teachers have had no training beyond high school. Six had two years of post secondary training and four had Bachelors Degrees. Three of the four teachers with Bachelors Degrees are expatriates. Three of the remaining teachers are also expatriates. All of the teachers stated that they had on-the-job training experience in the area they were teaching. The length of time worked at BWI ranged from eighteen months to 22 years. The number of years of teaching experience ranged from three to 22 years.

Business Education

Six of the seven Business Education teachers are expatriates. All of the teachers hold Bachelors Degrees and all but one stated that they had on-the-job experience in the occupational area in which they were presently teaching. Years of teaching experience range from six months to 13 years. The length of time worked at BWI ranged from six months to 12 years. The most recent occupational experiences

included positions in business management, senior training officer for clerical/secretarial, stenographer, bookkeeper and recording secretary.

Electrical Trades

Three of the teachers in Electricity/Electronics, are expatriates, two of which hold Bachelors Degrees in engineering. The other teachers have one to two years of post secondary training. On-the-job experience in electricity was from one to nine years. The years of teaching experience and length of time worked at BWI ranged from six months to 10 years. The most recent occupational experiences included positions in radio communication, residential and industrial wiring and electrical engineering.

Mechanical Trades

Four teachers in mechanical trades have no education beyond high school graduation from BWI. Five teachers had two years of post secondary training, and three had Bachelors Degrees. The three Bachelor Degree teachers are Liberian. The department has only two expatriates. All of the teachers stated that they have had on-the-job experience in the area in which they are teaching. The length of time worked at BWI ranged from six months to 33 years.

Comparison with Academic Teachers

Twenty vocational teachers hold Bachelors Degrees, 14 had post secondary training, and 11 had completed only high school. All academic teachers hold Bachelors Degrees and eight have Masters. Thirty-eight percent of the vocational teachers are expatriates and 51.4 percent of the academic

teachers are expatriates. The range of teaching experience in the vocational area was six months to 33 years and for academic teachers it was six months to 16 years.

APPENDIX F

APPENDIX F

PROJECT TRAINEES

<u>NAME</u>	<u>QUALIFICATION PRIOR TO DEPARTURE</u>	<u>LENGTH OF STAY</u>	<u>DEGREE EARNED</u>
Joseph M. Pratt	MS Agriculture	9/4/80 - 3/10/81	Certificate Food Processing
Arlef D. Kaba	AA Industrial Education	9/4/80 - 6/7/82	BS Industrial Education
B. Nuwo Jensen	BS Political Science	9/4/80 - 6/14/82	MEd Industrial Education Guidance
Joseph K. Roberts	BS Business Education	9/4/80 - 6/7/82	MEd Industrial Education Administration
Alfred S. Walker		9/4/80 -	
James K. Lompeh		9/4/80 -	

APPENDIX G

CAMPUS RENOVATIONS

	Nature of work required						
	CARPENTRY	CABINET- MAKING	ELECTRI- CAL	MASONRY	PLUMBING	PAINTING	AIR-CONDIT- IONING
AGRICULTURE SHOP			2			2	
DRAFTING SHOP	2	2	2	2	2	2	3
ELECTRICAL SHOP	3	3	2	3		2	3
ELECTRONICS SHOP	2	2	2	2		2	3
CABINET-MAKING SHOP			2		3	2	
CARPENTRY SHOP	2	2			3	2	
GENERAL AUTO-SHOP	2	2	3		3	2	
MACHINE SHOP						2	
MASONRY SHO						2	
PLUMBING SHOP	2	2	2			2	
OLD CURRICULUM BUILDING	3	3	2	2		2	
DINING HALL/AUDITORIUM	3	3	3	3	3	2	3
MASSAQUOI HALL							
WEEFUR HALL					2	2	
GRAHAM HALL	3	3	2	3	2	2	
THOMAS HALL	1	1	2	1	2	2	
PHELPS HALL	2	1	2		2	2	
STOKES HALL	2	1	2	1	2	2	
HENRIES HALL	2	1	2	2	2	2	
BUSINESS EDUCATION BUILDING	1	1	1		2	2	3
BRICK and BLOCK MAKING PLANT	2	2	3	2	2	2	

KEY: 1 ————— MINOR REPAIR
 2 ————— MAJOR REPAIR
 3 ————— REPLACEMENT or NEW CONSTRUCTION

APPENDIX H

LIBERIA VOCATIONAL TRAINING PROJECT NO. 669-0131 PHYSICAL INVENTORYMay 20, 1981Account: Cafeteria/Kitchen Department

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
2	Electric Dish washer-vacuum	2	2
3	Electric meat slicer (vegetable) Hobart	2	2
4	Electric juice mixer jet spray TJ3	2	2
6	Baking units (commercial types) blade	2	2
8	Electric stove woco	3	3
10	Gas steamer (Groen)	1	2
11	15 plate (Gerbs) 500 per pk	4 pk	1,536
12	Plastic cups	-	1,440
13	Folding tables	75	75
14	Folding chairs	400	400
17	Plastic bin	200	200
18	Jumbo bins	20	18
24	Heavy duty 24 cup muffin frames	6	6
26	Cast aluminum scoop	10	10
27	Aluminum flour sieves	6	6
28	Stainless flat ware spoon	1,000	1,008
29	Stainless flat ware forks	2,000	684

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
30	Stainless flat ware knives	2,000	2,304
34	Aluminum pressure cooker	4	2
41	Aluminum rolling pins (Don)	10	5
42	Vollrath 18-8 stainless steel pots	5	5
38	"Moline" biscuit cutter (Don)	6	6
45	Serving pans (12 5/8"x20 9/16"x6)	0	10
46	Food storage containers	2	2
48	General electric meat chopper	1	1
51	Multi-purpose brush (Gerbes)	4	4
52	Wire Brush (Gerbs)	4	4
53	Can opener	3	3
54	Can opener	3	2
N/N	Aluminum kitchen sink		1

LIBERIA VOCATIONAL TRAINING PROJECT NO.669-0131 PHYSICAL INVENTORYMay 27, 1981Account: Agriculture, Chemistry & Biology Lab.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
6	Modern Geometry Set III st/6	1 set	1 set
10	Science at work 6/set	1 set	1 set
12	1 simple machines film CST SEM.	1 set	1 set
14	Waves 4/st	1 set	1 set
15	Electricity FLM SRP. CSST. series	1 set	1 set
16	Energy the Key Filmstrip CST SR.	1 set	2 sets
N/N	Mearsuring Experiment - Kit	-0-	1 BX

LIBERIA VOCATIONAL TRAINING PROJECT NO.669-0131 PHYSICAL INVENTORY

May 27, 1981

Account: Electrical physics

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
1	Rheostat 500 OHM 1 amp max	5	5
2	Resistance Spool set of 8	2	2
8	Telephone Station	2	2
9	DC Volt meter 0-10V (31/21N)	8	5
10	Ammeter DC 0-5-AMP	8	8
11	Galvanometer single scale	2	2
12	Tuning Fork C261.6C253.3 8/51	8	8
13	Mid Tuning Fork C-512VPS	2	2
14	Induction Coil 25 MM Spark	2	2
17	Dersteds Law apparatus	3	3
18	Compass 25 mm	1 dz	1 dz
19	Magnet U Sharped Steel 3-3/4x3	6	6
22	MGNT HRSHE ALNCE VI25x100x38 mm	2	2
23	Magnetic Needle Agnte bearing	3	3
24	Calorimeter Electric	8	8
25	Calorimeter DBL Wall 300 Ml W/COV	4	4
27	High Frequency Demo Apparatus	2	2
28	Electrostatics set	10 st	1 st
29	Friction Rod Glass Hollow	6	6
30	Friction Rod Rubber HRD 1x25cm	6	6
32	Friction Pad silk 9x12	6	6
34	Friction Pad wool 8x8	6	6
35	Pith Ball, 8 mm PK/6	6 pk	6 pk

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
36	Electroscope Pith Ball	6	6
38	Induction spheres	2 pr	2 pr
39	Van De Graaf Generator JR	3	3
42	Pendulum Clamp	15	15
43	Balls assorted 1 set/5	20 st	16 st

LIBERIA VOCATIONAL TRAINING PROJECT NO.669-0131 PHYSICAL INVENTORYMay 27, 1981Account: Building Physics

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
2	Balance Triple beam SS Pans	5	2
3	Attachment Weight Set Metric	5	5
5	Torsion APP	3	3
7	Fly Wheel	1	1
9	Truss Boom Simple Form	15	3
10	Wheel & Axle Clamp Holder	12	2
13	Rotator Hand drive	2	2
16	Catch Bucket Aluminum	15	15
17	Hookes Law apparatus 600 CMCA	8	8
19	Radiometer 4 Blade	2	2
20	Hot Plate student 120V 50/50HZ	6	6
26	Air Jet Attachment	2	2
27	Friction Box	10	.0
29	Pressure Depth Apparatus	4	2
30	Magdeburg Hemispheres	1 pr	1 pr
S40820	Hydrometer	-0-	12

LIBERIA VOCATIONAL TRAINING PROJECT NO.669-0131 PHYSICAL INVENTORYMay 20, 1981Account: Agriculture

<u>ITEM NO.</u>	<u>DESCRIPTION.</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
2	Tractor-Massey-Ferguson Serial #9R010017	1	1
3	Rear blade-Massey-Ferguson	1	1
4	Post hole digger	1	1
5	Rotary cutter	2	1
6	Tractor: Serial #9A339088 MF 285 instead of MF265	1	1
7	Grain and fertilizer drill	1	1
8	Disc harrow Massey-Ferguson 24" Disc Dia. Cut out Blade Model #20017 Serial #82561	1	1
10	4 cubic yard hydraulic farm wagon Instead of item No.10, one manure spreader received with two used tires	1 0	- 1

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LIBERIA VOCATIONAL TRAINING PROJECT NO.669-0131 PHYSICAL INVENTORY

May 22, 1981

Account: Agriculture, Chemistry & Biology Lab.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDRED</u>	<u>QUANTITY IN STOCK</u>
25	Blood typing by saliva kit	1	1
28	Metabolism exp. kit	2	2
29	Human senses exp. kit	2	2
31	Healthy/Diseased pulamony sys.	1	1
34	Dang Education module	1	1
36	Venereal diseases	1	1
37	Seed structure enzyme action	6	6
39	Decomposition kit	2	2
40	Organs-Divisions lab in cell	1	1
41	1 D of organic nutrients kit	1	1
46	Seed staining kit	1	1
49	Plant cell study kit 6l	2	2
50	Cell structure Edu. Lab.	2	2
51	DNA staining kit	1	1
53	Ultrastructure of the cell	1 set	1 set
54	Intro to chromosome kit	1	1
55	Elements of genetic kit	1	1
56	Bugly-genetics experiment edu	1	1
58	Sickle cell disease module	1 set	1 set
60	Plant genetics	1	1
61	Genetics Concepts kit	1	1
62	Effect of antibiotics on bact.	1	1

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
63	Insect Vectors Kit	1	1
67	Intro. Microbiology Edu. Lab.	1	1
68	Plant Growth Regulator Module	1 set	1 set
70	Monocular Microscope	1	1
71	Hydroponics Exp. Kit #36	1	1
72	Plant Propagation Kit	1	1
73	Photoperiodism Kit	1	1
44	Food Chemistry Module	1	1
97	Brush Test Tube 12/pk	1 pk	1 pk
98	Brush Buset 24 & 50 ML 12/pk	1 pk	1 pk
99	Cleaner Tube 3 mm 50 ft/pk	1 pk	1 pk
100	Brush Camel Hair 12/pk	1 pk	1 pk
101	Flame spreader 16 mm 10/pk	4 pk	4 pk
102	Gas Ligher	3	3
104	Hooded Gas Lighter 12/pk	1 pk	1 pk
106	Clamp Lever	12	12
108	Clamp Screw $\frac{1}{2}$ x $\frac{3}{4}$ 10 pk	1 pk	3 pk
109	Clamp Screw $\frac{3}{4}$ x 1 10 pk	1 pk	1 pk
107	Screw clamp 3 pk	4 pk	3 pk
110	Rub. Stopper 3 - 10 Asstd. 33pk	1 pk	1 pk
111	Cork Boring Machine	1	1
112	Cork Asstd. #3-16 x Reg. pk 100	2 pk	2 pk
113	Test tube. 16 x 150 mm 72 pk	1 pk	1 pk
114	Test tube 25 x 150 mm 72 pk	1 pk	1 pk
115	Test tube 25 x 200 mm 48 pk	1 pk	1 pk
116	Molecular Model	1 cs	2 cs

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<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
117	10 Tubing Assorted Dia. 25 lb/cs	1 cs	1 cs
118	Watch Glasses 24 pk	1 pk	1 pk
119	Funnel Thistle 250 mm 25 ea/pk	1 pk	1 pk
121	Dessicator 150 mm pp/pc	1	1
122	TT Draining Rack PE	2	2
123	Bench Lab. Rack	2	2
124	Fisher Molecular Model Set	2	2
126	Brush 2 1/2" Dia. beaker	4	4
127	Cork Screw	4	4
128	Cork Knife stainless steel	2	2
129	Thermometer Student training Tip	10	10
130	Thermometer M 10 to P 500 C	2	2
131	Chemical Label Book	2	2
132	Tape Labeler Rotex	1	1
133	Pipet Support Rack PE	2	2
134	55 Ellipso Spoon 15 cm	2	2
135	56 Ellipso Spoon 21/cm	2	2
136	Trough Pneumatic PP 6 ea/cs	1 cs	1 cs
138	Asbestos Cloth 40" 5yd/pk	1 pk	1 pk
142	Beaker Heavy Duty 250 ml 12/pk	2 pk	2 pk
143	Bottle Dropping 30 ML 36/cs	1 cs	1 cs
145	Condenser Jacket 300 mm 1/pk 4 pk/cs	1 cs	1 cs

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
149	Labelling Tape for Rotex Labeler	10 pk	10 pk

<u>COST. NO.</u>	<u>DESCRIPTION</u>	<u>ORDERED</u>	<u>IN STOCK</u>
525739	Meberoine Transport Kit	-0-	11
	Soil Foundation of the Environment	-0-	1
	Live Nematode Kit	-0-	1
	Quality of Water Test Kit	-0-	1
	Enzymatic Hydrolysis	-0-	2
	Survey of Chemical Reaction	-0-	1 BX
	Cellular Chemistry	-0-	1
	Safety Pipet Filler	-0-	4
	High Vacuum Grease	-0-	3

LIBERIA VOCATIONAL TRAINING - PROJECT NO.669-0131 PHYSICAL INVENTORY

Account: Auto Mechanics

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>ORDERED</u>	<u>IN STOCK</u>
3	(B.G.) Gauge cylinder Bore Model G.A. 258 or equipment	1	1
4	(B.G.) Piston Pin Inserter set, Sunnon P/odel B-500, or equivalent	1	1
5	(B.G.) Cylinder Hone, Sunnon model an III or equivalent	1	1
6.	(B.G.) Valve spring compressor, large, with cam locking handle, range 1" thru 2½" spring diameter #2075	4	4
7	(B.G.) Carbon scraper, flexible	12	12
8	(B.G.) Steam cleaner/pressure	1	1
9	Paxton, drill heavy duty ½" electric, 500 RPM skill model 542 or equivalent	1	1
12	Paxton, Piston Ring groove cleaner	2	2
16	Paxton, camshaft bearing remover and installer kit, universal	1	1
18	Paxton, wheel balancer, off car.dynamic/ static, to include centering cone	1	1
20	Paxton axle stand 5 ton capacity	4 pr.	3 pr.
21	Paxton, floor jack 4000 lbs.	2	2
24	(B.G.) lift, twin post, frame contact, full hydraulic air oil operated 8000 lbs.	1	1
25	Air metal working kit	1	1
27	(B.G.) Engine analyzer	1	1

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
29	(B.G.) Hydrometer, automatic battery temp. adjust.	3	3
30	(B.G.) Oil can, pump type	4	4
31	(B.G.) Battery service kit	1	1
32	(B.G.) Air chuck, 1/4"	6	6
33	(B.G.) Shield, Arc welding, hand held	6	6
35	(B.G.) Flaring tool kit, all purpose	2	2
41	(B.G.) Drill bit set number bits 1 - 60	1 set	1 set
43	(B.G.) Tap and die set #S3465, contains NC & NF threads	1	1
44	(B.G.) Tap and die set, metric, 4 MM-0.70 mm thru 12 mm-1"75, 9 metric sizes	1	1
47	(Paxton) File cleaner, MFR #10	12	24
48	(Paxton) Files, 26 piece shop assortment	1	1
51	(Paxton) Power timing light	5	4
52	(Paxton) Assorted Plier set	1 set	1 set
57	(Paxton) metric tool assortment combination wrenches, flex sockets, sockets, handles, ratchet	1	1
61	(B.G.) Heavy duty air chisel, (Rockwell model 1112	1	1
63	(Paxton) Brake shop, Combination Disc and drum lathe and grinds brake shoes	1	1
64	(Paxton) Grinding wheel alum-Oxide (36 grit)	4	4
65	(Paxton) Grinding wheel alum oxide 60 grit	4	4

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<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>QUANTITY ORDERED</u>	<u>QUANTITY IN STOCK</u>
66	(B.G.) Micrometer, outside/ratchet. 3" to 4"	3	1
67	(B.G.) Micrometer, outside/ratchet 1" to 2"	3	3
74	(B.G.) Valve seat grinding wheel set #K-100	2	2

PLUMBERS EQUIPMENT

<u>Qty</u>	<u>Item</u>
5	Oil cans
2	Tool boxes
4	Tripod pipe vise stands
12	Ball Pein Hammers
8	Claw hammers
2	Pipe thread sets
3	Pipe cutters
4	Adjustable wrenches 8"
4	Adjustable wrenches 10"
1	Electric drill 3/8
4	Adjustable wrenches 4"
4	Stanley tapes 50 feet
2	Replacement cutters
2	Pairs plain pliers
3	Stanley tapes 100 feet
200	Hacksaw blades
20	Hacksaw frames
19	Folding 6' rules
2	Pipe reamers
16	Phillips screw drivers
6	Flat 3" screw drivers
4	Flat 6" screw drivers
6	Pipe wrenches 24"
8	Pipe wrenches 18"
2	Pipe wrenches 14"
2	Pipe wrenches 8"
1	No. 132 tubing cutters
2	No. 2P Strap wrench
2	8" adjustable wrench
2	7 Piece screw driver sets
2	10" Channel lock pliers
2	8" Combination pliers
2	10" English/metric tapes
1	5" Chain wrenches
2	No. 1 expansion bits
2	No. 2 rubber mallets
2	No. 10 tubing cutters

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AUTOMOTIVE EQUIPMENT

<u>Qty</u>	<u>Item</u>
2	Empty drill boxes
4	Welding helmets
2	6" Bench grinder
2	Tool box with complete socket set (27 pieces per box)
2	Sets oxyacetylene cutting and welding torches
18	Adjustable floor stands
4	Hand held welding helmets
20	Body forming hammers
8	Curved tooth files
6	Respirators with 2 extra fillers
1	Steel tape (50 feet)
4	Welding goggles
2	Electric hand drills
2	Screw extractor sets
1	Air sander
2	Jumper cables (20 foot)
6	Rubber sanding blocks
4	"C" clamps 3"
3	Sets Allan wrenches
3	Tin snips compound pressure
2	Drill chucks with keys
2	Steering wheel pullers
1	Spot welder
1	Welding helmet
1	Spray paint regulator and hose
2	Channel lock pliers
2	Micrometers 3-4 inches
1	Oxy acetylene gas welding set
78	Assorted sockets
1	Tap and die set
6	Stools
1	Timing light
1	Precision gauge
6	Creepers
1	Stud aligner (accessory for wheel balancer)
2	Micrometers 5-6 inches
1	Fuller rack empty
4	Tool racks
1	Thread chaser
2	Piston ring spreaders
2	Stethoscopes
1	Tool post grinder (Dumore)
2	Micrometers 3 inch
1	Spray paint regulator without hose
2	Gasket cutters
1	Orbital body sander (air operated)
1	Head light tester
1	10 gallon Sunnon oil for honing machine
1	Motorite injector tester (diesel)

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NEW TOOLS AND EQUIPMENT FOR AUTOMOTIVE SHOP

<u>Tool#</u>	<u>Qty</u>	<u>Tool#</u>	<u>Qty</u>	<u>Tool#</u>	<u>Qty</u>	<u>Tool#</u>	<u>Qty</u>
4706	1	4707	1	4708	1	4708L	1
4708S	1	4709	1	4709L	1	4710	2
4710L	1	4711	1	4711L	1	4712	1
4712L	1	4712S	1	4714	1	4714L	1
4716	1	4737	1	4737L	1	4738	1
4738L	1	4744	1	4745	1	4749	2
4760	1	4761	1	4763	1	4765	1
4766	1	4769	2	4770	1	4780	1
4785	1	4990A1/4	1	4990A1/4L	1	4990A1/8	1
4990A3/16	1	4990A3/16L	1	4990A3/8	1	4990A3/8L	2
4990A5/16	1	4990A5/32	1	4990A7/32	1	5012	1
5012H	1	5014	1	5014H	1	5016	2
6016H	1	5018	2	5020	1	5020H	1
5022	1	5022H	1	5024	1	5026	1
5028	1	5208S	1	5210	1	5210H	1
5210S	1	5212	2	5212H	1	5212S	1
5214	3	5214H	1	5214S	1	5216	4
5216H	1	5216S	1	5218	4	5218H	1
5220	3	5220H	1	5222	2	522H	1
5224	1	5226	1	5228	1	5240	1
5241	1	5242	1	5243	1	5244	1
5246	1	5249	4	5255	1	5256	1
5259	1	5260	1	5261	1	5262	1
5263	1	5265	1	5270	2	5280	1
5285	1						

One each of the following items:

1206M	1218M	65420
1207M	1219M	H913U
1208M	1220M	65452
1209M	1221M	93103
1210M	1222M	93104
1211M	1223M	93105
1212M	1224M	93106
1213M	1229M	65638
1214M	1230M	65639
1215M	1232M	65642
1216M	1236M	65640
1217M		65667
		65531
		65543

August 1982

APPENDIX I

CONFIDENTIAL

CONFIDENTIAL - SECURITY INFORMATION

APPENDIX I

DOCUMENTS PRODUCED BY PRAIRIE VIEW A & M

The following documents were produced by Prairie View A & M in compliance with the terms of the Liberian Vocational Training Project 669-0131.

VOCATIONAL EDUCATION ADVISORY SERVICES TO THE GOVERNMENT OF LIBERIA. A proposed plan for teacher education programs in industrial arts and vocational technical education. The document gives background information on rural teacher training institutions, rationale for teacher education in Liberia, justification for competency based teacher education, module components and production, a plan of action listing objectives and tasks and proposed financial arrangements including external and Liberian resources.

A PLAN FOR TRAINING PROGRAM FOR INSTRUCTIONAL PERSONNEL AT BOOKER WASHINGTON INSTITUTE. The plan is divided into the following sections: In-service Training; Instructional Analysis Worksheet; Performance Based Instruction; Writing Performance Objectives; Module Development Handbook; Module Development Assessment, Module Production; Guide for Implementation; Student Guide; Summary and Observation. All sections except In-service Training, Module Production Guide for Implementation and Student Guide were included in the Interim Report on Curriculum Development by Doctors Bill E. Lovelace and Frank Perazzoli, February - March 1981.

A PERFORMANCE EVALUATION SYSTEM FOR INSTRUCTIONAL STAFF. The guide is divided into three sections. The first section is a Guide for Conducting Faculty/Staff Performance Evaluation which outlines the procedures to follow in reviewing performance and evaluating all Booker Washington Institute faculty and staff. The second section is devoted to Instructors Performance Evaluation. Evaluation sheets for twelve vocational areas at BWI are included: farm management; food processing; drafting; cabinetmaking; carpentry; masonry; plumbing; electronics; electricity; machine shop; auto mechanics; and diesel. Test criteria for the evaluation of department instructional staff and a chart for the evaluation of instructional programs was also included. The third section is an Evaluation System which includes self evaluation by faculty and staff, performance evaluation by a visiting committee, student opinion questionnaire and program review.

A PLAN FOR INSTRUCTIONAL SCHEDULES TEACHER ASSIGNMENTS AND STUDENT COURSE REQUIREMENTS. The document includes a conceptual model for developing cost effective schedules for students, staff and facilities and instructional schedules for the

agriculture, building, electrical and mechanical trades. The schedules showed the department, trade area, academic year, the course name and number, grade level, class section, number of students per section, instructor code by semester.

AN ADMISSION SYSTEM. The report is divided into two sections: admission under the four year program; and the proposed admission system for the three year program. The admission system for the three year program is presented in three parts: the admission standards; steps in administering the admission standards; and elements of supervision of the admission system.

A GUIDANCE SYSTEM. The guidance system under the four year program and a proposed guidance system for the three year program is presented. The proposed system is divided into guidance standards, the steps in administering the guidance standards, and elements of supervision of the guidance system.

A STUDENT INTERN PROGRAM. The guide includes student internship standards, steps in administering student internship standards, elements of supervision of the student internship system and student job placement and follow-up.

A PLAN FOR PARTICIPANT TRAINING. The report presents the following topics: An introductory statement on training in general and training according to the contract, an identification of the participant trainees in the program, statements of goals, objectives and activities for the training program, a summary of results and an exhibit of reports prepared during the contract period.

A PLAN FOR A SCHOOL FARM. The plan includes goals and objectives of the school farm, the organizational structure, the job descriptions for the agricultural production superintendent and supervisor and planning and supervising the farm.

A PLAN FOR AN INDUSTRIAL ARTS TEACHER EDUCATION PROGRAM. The report gives background information on the proposed three year industrial arts teacher training program designed to provide industrial arts teachers for grades 7 - 9. The curriculum for the three year program is outlined and course descriptions are included.

A PLAN FOR AN INDUSTRY LIAISON PROGRAM. The report outlines the design part of the task and presents a plan for an industry liaison system for BWI. The purpose and function of the system organizational structure, personnel involvement and activities are included.

A PLAN FOR LIBRARY SERVICES. The report describes the library services four year program, and the learning resources

center and the audio-visual resources center are a part. A diagram of a layout for the learning resources center is included.

A PLAN FOR REPAIR AND RENOVATION OF CLASSROOMS AND TECHNICAL SHOPS. The publication provides methods, procedures, and techniques for implementing an effective repair and maintenance program for BWI. It was designed to assist the Ministry of Education and BWI in determining the number of employees needed for the repair and maintenance department, provided job descriptions, work flow schedules and a list of needed renovations.

A PLAN FOR TRAINING PROGRAMS AND SUPERVISORY PRACTICES FOR ADMINISTRATORS, INSTRUCTIONAL STAFF AND SUPPORT STAFF. The publication outlines a training program and supervisory practices to provide competency development for administrative and support staff.

THE DEVELOPMENT OF AN ORGANIZATIONAL AND ADMINISTRATIVE STRUCTURE. The document provides the organizational structure and administration procedures needed to restructure the secondary vocational training program at BWI. Organization of BWI under the four year program and the three year program is included as well as job descriptions of BWI employees and organizational charts.

DEVELOPMENT OF A THREE YEAR SECONDARY CURRICULUM. The publication is organized into two sections. The first is the curriculum structure which contains BWI history and general academic information. The second is the curriculum guides and outlines for each of the twelve occupational trades and the course descriptions.

APPENDIX J

APPENDIX J

THE NATIONAL NETWORK FOR CURRICULUM COORDINATION IN
VOCATIONAL AND TECHNICAL EDUCATION (NNCCVTE)

Northeast Curriculum Coordination Center
Bureau of Occupational Research
Division of Vocational Education
225 West State Street
Trenton, New Jersey 08625

Southeast Curriculum Coordination Center
Mississippi State University
Research and Curriculum Unit
Drawer JW
Mississippi State, Mississippi 39762

East Central Curriculum Management Center
Illinois Office of Education
100 North First Street (E-426)
Springfield, Illinois 62777

Midwest Curriculum Coordination Center
Oklahoma State Department of Vocational & Technical Education
1515 West 6th Avenue
Stillwater, Oklahoma 74074

Northwestern Curriculum Coordination Center
Washington State Coordinating Council for Occupational Education
222 Industrial Park Box 17
Olympia, Washington 98504

Western Curriculum Coordination Center
Vocational Education Section
Department of Education
721 Capitol Mall
Sacramento, California 95814

CURRICULUM DEVELOPMENT CENTERS

California State Department of Education
721 Capitol Mall
Sacramento, California 95814

Curriculum Materials Service
Department of Vocational Education
Colorado State University
Vocational Education Building
Fort Collins, Colorado 80523

Career Education Center
415 North Monroe Street
Tallahassee, Florida 32306

The Center for Vocational Education Curriculum Materials Dev.
628 Aderhold Hall
University of Georgia
Athens, Georgia 30602

American Association for Vocational Instructional Materials
Engineering Center
Athens, Georgia 30602

Illinois Curriculum Management Center
Division of Vocational and Technical Education
1035 Outer Park Drive, Suite 201
Springfield, Illinois 62706

Instructional Materials Laboratory
School of Technology
Indiana State University
Terre Haute, Indiana 47800

Minnesota Instructional Materials Center
3300 Century Avenue North
White Bear Lake, Minnesota 55110

Research and Curriculum Coordinating Unit
Mississippi State University
P. O. Drawer DX
State College, Mississippi 39762

Instructional Materials Laboratory
8 Industrial Ed., University of Missouri
Columbia, Missouri 65201

Vocational-Technical Curriculum Laboratory
Rutgers University
Building 4103 - Kilmer Campus
New Brunswick, New Jersey 08903

Iowa Association for Vocational Instructional Materials
Agricultural Engineering Department
Iowa State University
Ames, Iowa 50010

Kansas Vocational and Technical Curriculum Center
Kansas State College of Pittsburgh
Pittsburgh, Kansas 66762

Curriculum Development Center
Taylor Education Building, Room 151
University of Kentucky
Lexington, Kentucky 40506

Vocational Curriculum Development and Research Center
P. O. Box 657
Natchitoches, Louisiana 71457

Vocational Curriculum Research and Development Center
Department of Industrial Education
University of Maryland
College Park, Maryland 20742

Technical Education Research Center
44 Brattle Street
Cambridge, Massachusetts 02138

Massachusetts Center of Occupational Education
Two Sun Life Park, 100 Worcester Street
Wellesley Hills, Massachusetts 02181

Curriculum and Instructional Materials
Center
State Department of Vocational and Technical Education
1515 West Sixth Avenue
Stillwater, Oklahoma 74074

Continuing Education Publications
Extension Annex
Corvallis, Oregon 97331

Vocational Education Resource Center
Regional Office of Education
Box 729
Hato Rey, Puerto Rico 00917

Vocational Instruction Unit
New Mexico State Department of Education
Education Building
Santa Fe, New Mexico 87503

Institute for Occupational Education
Cornell University
Stone Hall
Ithaca, New York 14840

The Center for Occupational Education
North Carolina State University
Raleigh, North Carolina 27607

The Center for Vocational Education
The Ohio State University
1960 Kenny Road
Columbus, Ohio 43210

Instructional Materials Laboratory
Trade and Industrial Education
The Ohio State University
1885 Neil Avenue
Columbus, Ohio 43210

Vocational Education Media Center
Clemson University
Freemen Hall
Clemson, South Carolina 29631

Vocational Curriculum Laboratory
State of Tennessee
Department of Education
P. O. Box 1114
Murfreesboro, Tennessee 37130

Instructional Materials Center
Division of Extension
The University of Texas at Austin
Austin, Texas 78712

Vocational Instructional Services
Vocational-Industrial Education Department
Texas A & M University
College Station, Texas 77843

Curriculum Laboratory
Cedar Lakes Conference Center
Ripley, West Virginia 25271

APPENDIX K

APPENDIX K

PLANS FOR RENOVATING AND EXPANDING SHOP SPACE

1. Diesel training shop (old machine shop) classroom, tool room and rest rooms installed as well as the lift.
2. Electronics shop wall has been taken out to make a larger lab, rogue bars, air conditioning, and electrical wiring is in progress.
3. Shelving has been installed in the tool room of the machine shop.
4. Two annexes have been planned--one for woodwork and one for masonry.
5. Renovation of auto shop to include a classroom and tool room.
6. Hole in body and fender shop filled in (original plans were for a twin post lift to be installed).
7. Convert old welding shop to air conditioning and refrigeration.
8. Remodel old curriculum building to make classrooms.
9. Plans for the welding shop include tarpaulins, booths, oxygen and acetylene manifolds, and electrical wiring.
10. Plans for machine shop include new transformers, possibly new breaker and main electrical box, installation of air lines and air compressors, installation of screen gates on large sliding doors, and new gutter/trench covers.
11. Plans for remodeling Business Education and Home Economics areas are in progress.
12. Plans for a new classroom building, a new administration building and a new bachelor apartment building have been discussed.

APPENDIX L

INTERNSHIP PLACEMENT

AGRICULTURE

Salala Rubber
Firestone Plantations Company
Tubman's Estate
Rubber Corporation in LAC
Cocopa Rubber Corporation

BUILDING TRADES

LAMCO Yekepa and LAMCO Buchanan
Excham
L.P.M.C.
C.F. Wilhelm Gantzen
Cedar Furnishing Company
Beminkainen O.Y.
Monrovia Breweries Inc.
Fayead Industrial Center
Luffiam
L.E.C.
Euccimazzi
Devence
Palm-Bay
K.O.G.
Faufirm Construction Company (Bong Co.)
L.P.R.C.
Firestone
A.D.P.
L.C.A.D.P.
L.A.C.
Public Works
L.T.C.
Bong Mine
B.C.D.P.
Mesurado G. Co.
Loufram Organization Office
Eric Cox
M.P.A.
J.F.K.
R.I.A.
C.U.C.
L.W.S.C.
B.W.I. Meccado Engineering Co.
Yecco
S.R.C.

BUSINESS EDUCATION

Monrovia City Corporation
Texaco Africa Ltd.
National Milling Company of Liberia
Liberia Electricity Corporation
Ministry of Local Government

BUSINESS EDUCATION (Continued)

Lamco Buchanan
 Monrovia Tractor Corporation
 Atlantic Marketing Corporation
 Lone Star Insurance Inc.
 Liberia Produce Marketing Corpoartion
 Lamco Yakepa/Management Accounting
 Bureau of the Budget
 The Liberia Match Company
 Swiss African Trading Corporation (SATCO)
 Liberia Telecommunication Corporation
 W.V.S. Tubman Estates
 JFK Medical Center
 Ministry of Education
 Phebe Hospital
 Firestone Plantation Company
 Ministry of Finance
 Liberia Cement Corporation
 National Housing and Savings Bank
 Liberia Rubber Processing Corporation
 Liberia Bank of Development and Investment
 Tradveco Bank
 National Social Security and Welfare Corporation
 Civil Service Agency
 Bank of Credit and Commerce

ELECTRICAL

LAMCO J.V. Operating Company Nimba and Grand Bassa Counties
 Liberia Telecommunication Corporation Montserrado County
 Liberia Electricity Corporation, Montserrado County
 Swiss African Trading Company (SATCO) Montserrado County
 Booker Washington Institute
 Palm Bay Company Grand Bassa County
 Exchem Marshall Territory
 The Liberian Produce Marketing Corporation (LPMC) Montserrado
 Kakata Rewinding Company Gibi Territory
 Phebe Hospital
 Watanmal Electronics Monteserrado County

MECHANICAL TRADES

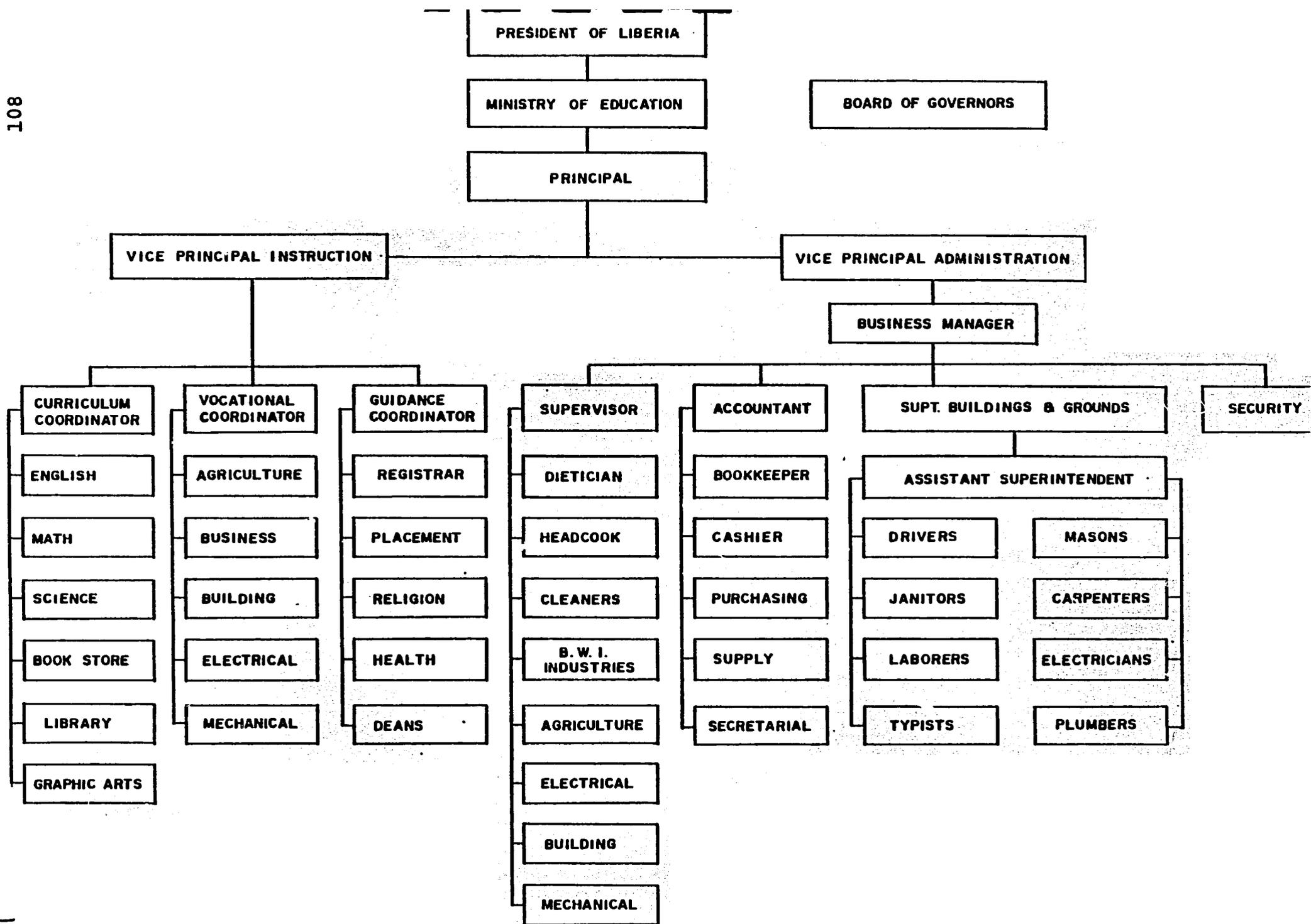
Firestone Plantation
 Lamco Buchanan and Yekepa
 Liberian Produce Marketing Corporation
 Mesurado Groups Complex
 Booker Washington Institute
 Porto Della Torre
 Cement Company
 Alan L. Grant
 Spolaber
 Liberian Petroleum Refinery Corporation
 Liberian Rubber Product Company
 Technical Engineering Machine Shop

MECHANICAL TRADES (Continued)

Salala Rubber Corporation
Monrovia Brewery
Cocopa
Chicri Garage
Elias Automotive Garage
Liberian Sugar Corporation
Liberian Agriculture Company

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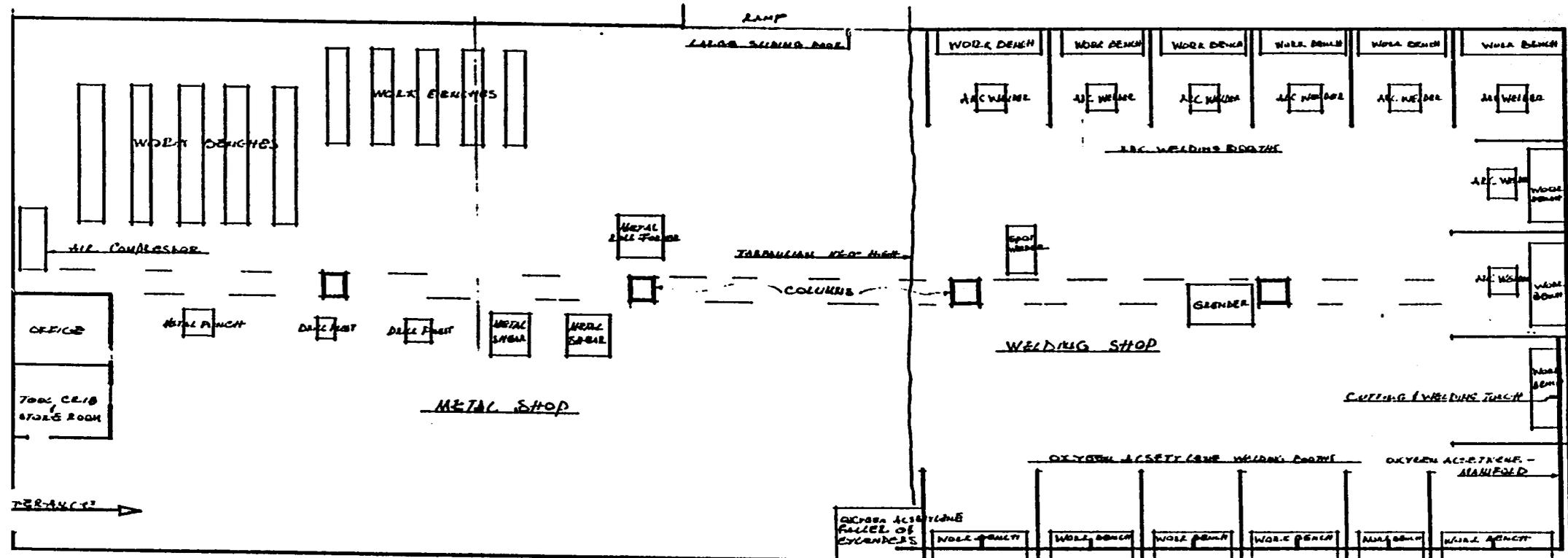
APPENDIX M



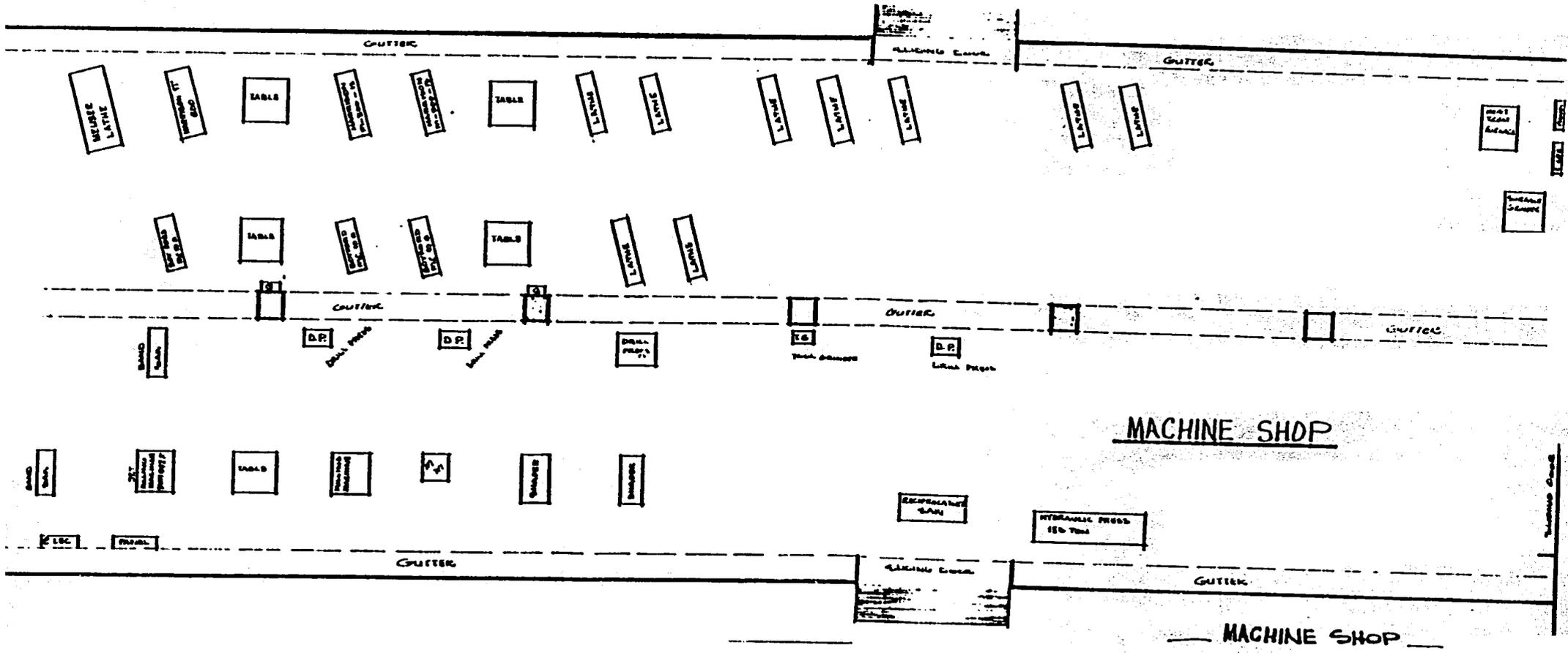
APPENDIX N

SPACE IN TRADE SHOPS

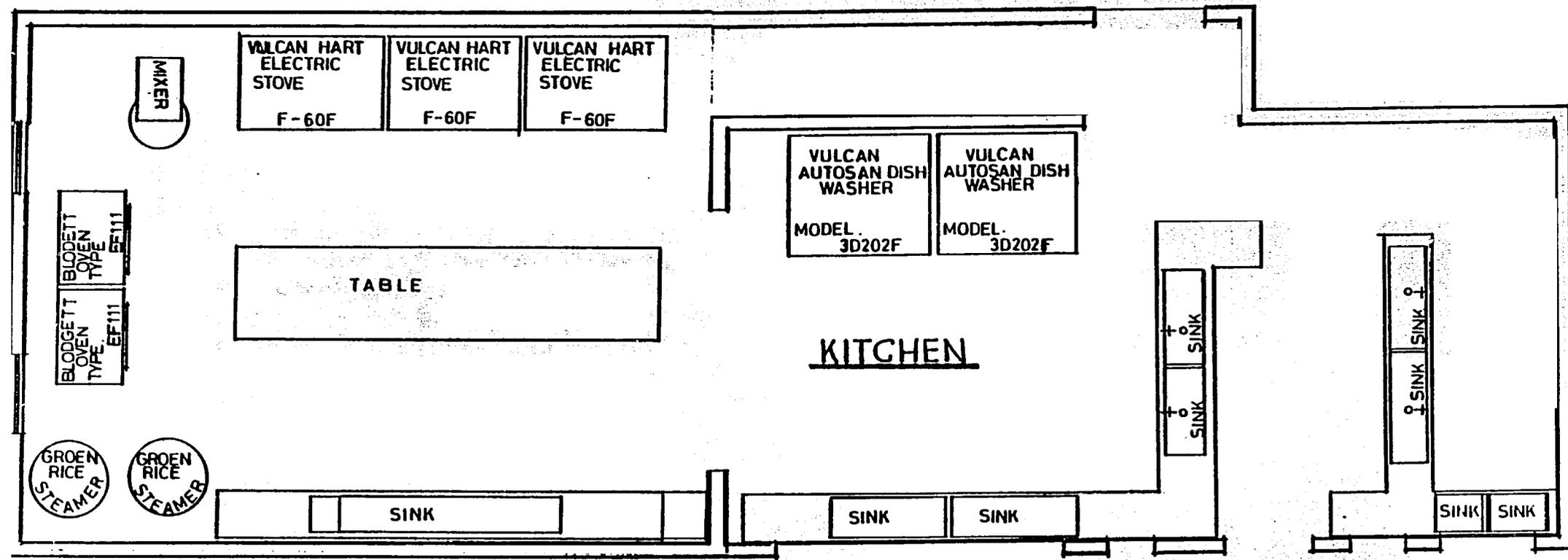
<u>SHOP</u>	<u>SQUARE FOOTAGE</u>
Machine Shop	7,776
Metal Shop	2,592
Diesel Shop	2,700
Automotive Shop	
Garage Area	2,400
Outside Area	3,200
Electronics	1,280
Maintenance Shop	2,400
Carpenter Shop	2,400
Cabinetmaking Shop	532
Body and Fender Shop	
Work Area	1,840
Paint Area	360
Electric Shop	2,000
Refrigeration/Air Conditioning	1,200
Welding Shop	2,592



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APPENDIX O

IN-SERVICE TEACHER EDUCATION PROGRAM FOR BWI

Selected performance-based teacher education materials developed and tested by the Center for Vocational Education at the Ohio State University, Columbus, Ohio, and published by the American Association for Vocational Instructional Materials will be adapted for use at BWI along with supplemental material from teachers' resources. Forty hours of in-service training will be offered the first year. The training sessions will be held on ten Saturdays from 8:00 A.M. to 12:00 Noon. The first session will orient the teachers to the performance-based teacher education materials. Mr. Joseph Roberts, Vice Principal of Instruction, who attended a three day PBTE workshop while studying in the US is qualified to direct the program and to select and train resource persons. The following modules that will meet the immediate needs of the teachers have been selected for the first year of in-service training:

- B-1 Determine Needs and Interests of Students
- B-2 Develop Student Performance Objectives
- B-3 Develop a Unit of Instruction
- B-4 Develop a Lesson Plan
- B-5 Select Student Instructional Materials
- B-6 Prepare Teacher-Made Instructional Materials
- C-2 Conduct Group Discussions, Panel Discussions, and Symposiums
- C-3 Employ Brainstorming, Buzz Group, and Question Box Techniques

- C-4 Direct Students in Instructing Other Students
- C-7 Direct Student Laboratory Experience
- C-9 Employ the Project Method
- C-16 Demonstrate a Manipulative Skill
- C-17 Demonstrate a Concept or Principle
- D-2 Assess Student Performance: Knowledge
- D-4 Assess Student Performance: Skills
- E-7 Assist Students in Developing Self-Discipline
- C-10 Introduce a Lesson
- C-11 Summarize a Lesson

These modules will be used in group sessions. In addition to these modules, it is recommended that individuals complete the following modules under the guidance of a resource person:

- C-5 Employ Simulation Techniques
- C-6 Guide Student Study
- C-8 Direct Students in Applying Problem-Solving Techniques
- C-13 Employ Reinforcement Techniques
- C-14 Provide Instruction for Slower and More Capable Learners
- C-23 Present Information with Overhead and Opaque Materials
- C-24 Present Information with Filmstrips and Slides
- C-29 Present Information with the Chalkboard and Flip Chart
- D-5 Determine Student Grades
- D-6 Evaluate Your Instructional Effectiveness
- E-4 Maintain a Filing System
- E-5 Provide for Student Safety

E-8 Organize the Vocational Laboratory

E-9 Manage the Vocational Laboratory

It is further suggested that the coordinator of the internship program use the following modules:

J-4 Secure Training Stations for Your Co-Op Program

J-5 Place Co-Op Students on the Job

J-6 Develop the Training Ability of On-the-Job Instructors

J-7 Coordinate On-the-Job Instruction

J-8 Evaluate Co-Op Students; On-the-Job Performance

APPENDIX P

MODEL PROGRAMMED TEACHING UNIT

The programmed teaching unit was developed as a model to enable the readers of the Scope of Work to envisage the final product of such a project. The programmed teaching unit was designed to control the behavior of unqualified and underqualified teachers.

The content for the model programmed teaching unit was adapted from the following unit:

Residential Carpentry, State Department of Vocational and Technical Education, Stillwater, Oklahoma, USA.

Residential Carpentry is a basic curriculum for carpentry based on an analysis of the residential construction industry by the Associated General Contractors of America and the Curriculum and Instructional Materials Center, The Oklahoma State Department of Vocational and Technical Education.

The curriculum includes twelve sections with one or more units of instruction. Each unit includes behavioral objectives, suggested teacher and student activities, information sheets, assignment sheets, job sheets, visual aids, tests and answers. The model, drawn from the section on hand tools, provides the content, methodology, and tests/evaluation.

LESSON 1: HAND TOOLS

TASK SAY: I am going to show you planes and squares and tell you about their use. Listen carefully, later I will ask questions.

1. SHOW THE JACK PLANE.
SAY: The jack plane is 14 inches long, two inches wide and is used for general purposes.

2. SHOW THE PRINCIPAL PARTS.
NAME EACH PART AS YOU REMOVE IT.

RELEASE LEVER CAP AND REMOVE.

SAY: This is the lever cap.

REMOVE PLANE IRON AND PLANE IRON CAP.

SAY: This is the plane and the plane iron cap.

USE LEVER CAP AS A SCREWDRIVER AND LOOSEN SCREW THAT SECURES THE PLANE IRON CAP TO THE PLANE IRON.

REASSEMBLE THE PARTS ON THE PLANE.

TASK SAY: I am going to remove the parts of the plane again and I will ask you to name the parts.

3. REPEAT THE PROCEDURES IN 2 ABOVE.

4. SHOW REMAINING PARTS OF THE PLANE.

5. POINT TO THE FRAME.

SAY: The frame is the body of the plane and determines its size. The bottom of the frame is called the sole.

POINT TO THE KNOB AND HANDLE.

SAY: The knob and handle are used to hold the plane.

POINT TO THE FROG.

SAY: The frog is made of cast iron, provides the angle to which the plane iron is held and positions it at the rear of the mouth.

POINT TO THE LATERAL ADJUSTING LEVER

SAY: The lateral adjusting lever is used to adjust the plane iron for an even thickness of shaving.

POINT TO THE ADJUSTING NUT.

SAY: The adjusting nut is used to increase or decrease depth of cut or thickness of shaving.

6. SHOW THE BLOCK PLANE.

SAY: The block plane is 4-6 inches long, 1 3/8 to 1 5/8 inches wide and is used for small jobs on trim or end grain.

7. SHOW THE PRINCIPAL PARTS.

NAME EACH PART AS YOU REMOVE IT.

RELEASE THE LOCKING SCREW AND REMOVE CAP.

SAY: This is the cap.

REMOVE PLANE IRON.

SAY: This is the plane iron.

POINT TO THE FRAME.

SAY: The frame is the body of the plane and determines its size. The bottom of the frame is called the sole.

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POINT TO THE KNOB.

SAY: The knob is used for holding and the frame serves as a handle.

POINT TO THE ADJUSTING NUT.

SAY: The adjusting nut is used to increase or decrease depth of cut or thickness of shaving.

8. SAY: The block plane does not have a cap iron, and differs from the jack plane in that the cutter is set at a 20 degree angle instead of 45.

9. DEMONSTRATE USE OF JACK PLANE AND BLOCK PLANE.

10. DIRECT STUDENTS IN RETURN DEMONSTRATION.

11. SHOW STUDENTS HOW TO CLEAN THE PLANES OF ALL SHAVINGS WITH A BRUSH.

12. SHOW STUDENTS HOW TO TIGHTEN SCREWS IN HANDLE, KNOB, AND FROG.

13. SAY: when planes are not to be used for a long period of time, all metal parts should be covered with a film of oil before storing in a dry place.

TASK READ THE QUESTIONS
SIGNAL: Hand (oral response)

14. How long and how wide is the jack plane? (14 inches long, 2 inches wide)

15. What parts of the jack plane can be removed? (lever cap, plane iron and plane iron cap)

16. How would you describe the frame of the jack plane? (the frame is the body of

the plane and determines its size)

17. What is the bottom of the frame called? (the sole)

18. What is the frog made of? (cast iron)

19. What is the function of the frog? (the frog provides the angle to which the plane iron is held and positions it at the rear of the mouth)

20. What is the knob and handle on the plane used for? (the knob and handle is used for holding)

21. How is the lateral adjusting lever used? (the lateral adjusting lever is used to adjust the plane iron for an even thickness of shaving)

22. How is the adjusting nut used? (the adjusting nut is used to increase or decrease depth of cut or thickness of shaving)

23. How long and how wide is the block plane? (406 inches long, 1 3/8 to 1 5/8 inches wide)

24. What serves as a handle on the block plane? (the frame serves as a handle)

25. How does the block plane differ from the jack plane? (the cutter is set at a 20 degree angle on the block plane instead of 45 degrees like the jack plane)

26. Where should planes be stored? (in a dry place)

27. What do you put on planes that are not going to be used for a long period of time? (all metal parts should be covered with a film of oil before storing)

TASK SAY: I am going to show you squares and tell you about their use. Listen carefully, later I will ask questions.

28. SHOW STEEL SQUARE.
SAY: Steel squares have a 12" or 24" blade and an 8" or 16" tongue, and is used for general framing procedures for layout of walls, partitions, rafters, braces and stairs.
29. DEMONSTRATE STEEL SQUARE BY USING 1" X 12" BOARD, PLACE BLADE OF STEEL SQUARE AGAINST LONGEST EDGE OF BOARD, MOVE TO END OF BOARD AND CHECK FOR SQUARENESS AGAINST THE TONGUE OF THE SQUARE.
30. SHOW COMBINATION SQUARE.
SAY: The combination square has a 12" blade, adjustable handle with 90 degree and 45 degree side, and is used for general purpose squaring, measuring and leveling.
31. DEMONSTRATE COMBINATION SQUARE BY LAYING OUT A 45 AND 90 DEGREE ANGLE.
32. SHOW SLIDING T-BEVEL.
SAY: The sliding T-bevel has a solid steel or wood handle, with an adjustable blade usually six inches long, and is used to measure or transfer angles other than 90 degree, and to test or check a miter cut.

33. DEMONSTRATE USE OF SLIDING T-BEVEL BY LOOSENING THE CLAMPING SCREW AND MOVING THE BLADE TO SET DESIRED ANGLE WITH THE AID OF A PROTRACTOR OR STEEL SQUARE.

TASK READ THE QUESTIONS
SIGNAL: Hand (oral response)

34. How big is the blade in the steel square? (12 or 24 inches)
35. How big is the tongue in the steel square? (8 or 16 inches)
36. How is the steel square used? (general framing procedures, layout of walls, partitions, rafters, braces and stairs)
37. How big is the blade on the combination square? (12 inches)
38. What are the two sides on the combination square? (90 and 45 degree)
39. How is the combination square used? (general purpose squaring, measuring and leveling)
40. How long is the sliding T-bevel blade? (usually 6 inches)
41. How is the sliding T-bevel used? (to measure or transfer angles other than 90 degree and to test or check a miter cut)

TASK WRITE QUESTIONS ON THE CHALKBOARD.
SIGNAL: Students write answers on paper and hand in.

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42. Identify two types of planes and write a use for each.

43. Identify 3 types of squares and write a use for each.

TASK SAY: I am going to show you Handsaws and tell you about how to use them.

44. NAME THE PRINCIPAL PARTS OF A SAW.

POINT TO THE HANDLE.

SAY: The handle is shaped to hold and apply pressure on the cutting stroke.

POINT TO THE BLADE.

SAY: The blade is the part in which the teeth are filed.

POINT TO THE TOE.

SAY: The toe is the end of the blade opposite the handle.

POINT TO THE HEEL.

SAY: The heel is the portion of the blade nearest the handle.

POINT TO THE BACK.

SAY: The back is the edge of the blade opposite the teeth. Saws are made with straight or curved backs.

45. SAY: For good service a saw must have a smooth blade. Prevent rust which roughens a saw blade by wiping it with oil or wax and store in a dry place with cutting edge free from contact with other objects.

46. SHOW THE CROSSCUT SAW.

SAY: The crosscut saw is 20 to 26 inches in length, 4-12 points per inch with teeth filed at an angle across the face (teeth resemble knife edges) and is used to cut across the grain of wood. A crosscut saw with large teeth is used for rough work; one with fine teeth is used for finish work.

47. DEMONSTRATE USE OF CROSSCUT SAW BY CUTTING BOARDS TO LENGTHS.

48. SHOW THE RIP SAW.

SAY: The rip saw is 20 to 28 inches in length, 5-7 points per inch with teeth square across the face (the teeth resemble chisle points) and is used to cut with the grain of the wood.

49. DEMONSTRATE THE USE OF THE RIP SAW BY CUTTING BOARDS TO LENGTHS.

50. SHOW THE BACK SAW (MITER BOX SAW).

SAY: The back saw is 12 to 28 inches in length, 11 points per inch, has fine teeth and a thin blade with a heavy metal band across the back to strengthen the blade, and is used for joinery and in a miter box.

51. DEMONSTRATE THE USE OF THE BACK SAW BY CUTTING BOARDS STRAIGHT AND EVEN.

52. SHOW THE COMPASS SAW.

SAY: The compass saw has a tapered blade, rip teeth, and is used to cut gentle curves and inside corners.

53. DEMONSTRATE THE USE OF THE COMPASS SAW BY CUTTING TO A CURVE.

54. SHOW THE HACK SAW.
SAY: The hack saw is U-shaped and is used to cut all types of metal fasteners, hardware, and metal parts.

55. DEMONSTRATE THE USE OF THE HACK SAW BY CUTTING METAL PARTS.

TASK READ THE QUESTIONS
SIGNAL: Hand (oral response)

56. What are the principal parts of a saw?
(handle, blade, toe, heel, back)

57. How do you prevent a saw blade from rusting?
(wipe the blade with oil or wax)

58. How do the teeth differ on the crosscut saw and the rip saw? (crosscut saw teeth are filed at an angle resembling knife edges, rip saw teeth are square across the face resembling chisle points)

59. What is the difference in the way you use a crosscut saw and a rip saw?
(crosscut saw cuts across the grain of wood, the rip saw cuts with the grain)

60. The back saw is used for what purpose?
(joinery and in a miter box)

61. How is the compass saw used? (to cut gentle curves and inside corners)

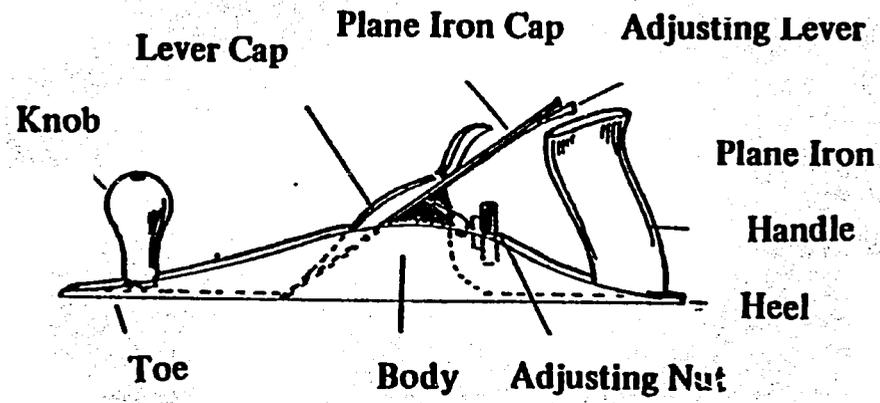
62. How is the hack saw used? (to cut all types of metal fasteners, hardware and metal parts)

63. Identify six types of handsaws and write the use for each.

TASK WRITE QUESTION ON CHALKBOARD.
SIGNAL: Students write answer on paper to hand in.

SAMPLE OF ILLUSTRATIONS TO BE INCLUDED

Iron Plane



APPENDIX Q

FRESHMAN

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
General Woodwork	11	8	General Woodwork	12	8
Mechanical Drawing	11	2	Mechanical Drawing	12	2
Masonry	11	4	Masonry	12	4
Plumbing	11	4	Plumbing	12	4
Trade Math	11	2	Trade Math	12	2
English	11	4	English	12	4
African History	11	2	West African History	12	2
General Math	11	4	Algebra	12	4
Biology I	11	4	Biology II	12	4
R.O.T.C.	11	1	R.O.T.C.	12	1
		<u>35</u>			<u>35</u>

SOPHOMORE

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Electrical Technology I	11	2	Electrical Technology	12	2
Residential Wiring	11	8	Residential Wiring	12	8
Machine Technology	11	10	Machine Technology	12	10
English	21	4	English	22	4
World Geography	21	2	West African Geography	22	2
Algebra II	21	4	Algebra III	22	4
Physics I	21	4	Physics II	22	4
R.O.T.C.	21	1	R.O.T.C.	22	1
		<u>35</u>			<u>35</u>

JUNIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Auto Techonology	11	12	Auto Technology	12	12
Machine Technology III	21	8	Machine Technology III	22	8
English	31	4	English	32	4
World History	31	2	World History	32	2
Geometry I	31	4	Geometry II	32	4
Physics III	31	4	Physics IV	32	4
R.O.T.C.	31	1	R.O.T.C.	32	1
		<u>35</u>			<u>35</u>

SENIOR

<u>FIRST SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>	<u>SECOND SEMESTER</u>	<u>COURSE NO.</u>	<u>CREDIT HOURS</u>
Techniques of Furniture Construction	31	8	Techniques of Furniture Construction	32	8
Carpentry & Joinery	31	8	Carpentry & Joinery	32	8
Trade Drawing	31	4	Trade Drawing	32	4
English	41	4	English	42	4
Economics	41	2	Economics	42	4
Algebra & Trig.	41	4	Algebra & Trigonometry	42	4
Education	41	4	Education	42	4
R.O.T.C.	41	1	R.O.T.C.	42	1
		<u>35</u>			<u>35</u>

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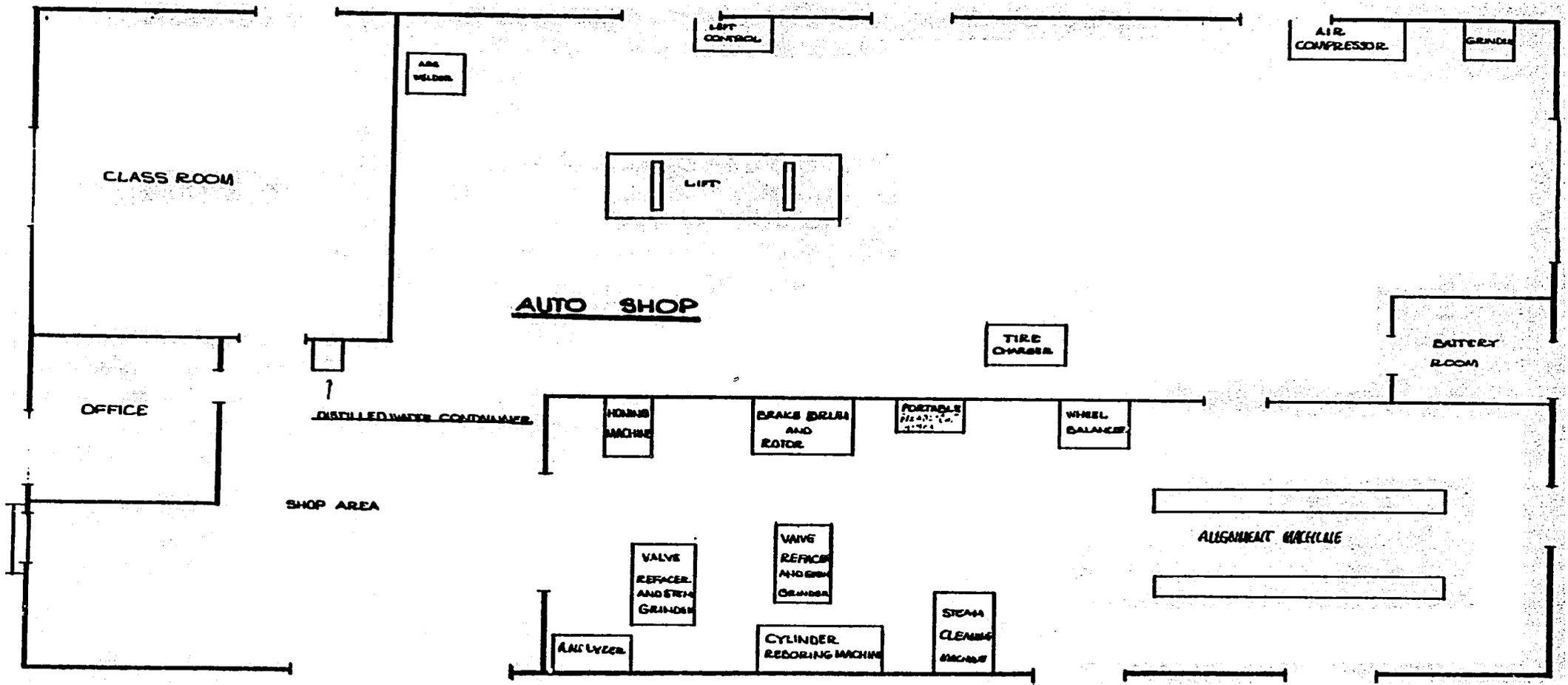
APPENDIX R

APPENDIX R

PARTS NEEDED TO MAKE EQUIPMENT OPERATIONAL

EQUIPMENT	PARTS	SOURCE
Joiner Serial No. 8220	(3) 12" blades	Moak Machine & Tool Co. Port Huron, Michigan
Combination Band & Jigsaw Serial No. 4881-A	Rubber shoe on upper wheel	Crescent Woodworking Leetonia, Ohio
Large Planer 36 x 8 Model 44 Serial No. 5701	(3) blades Motor for sharpen- ing apparatus Motor & switches for traverse action	Buss Machine Works Holland, Michigan
Jigsaw 24" Saber saw Table saw 8"	Assorted blades Assorted blades 1 HP motor, 3600 RPM-V-belt, con- trol box & cable	Rockwell Mfg. Co. Power Tool Division Milwaukee, Wisconsin
Joiner 6"	(1) set blades 5/8" X 6"	
Drill press	Motor 1/2 HP, 1750 RPM-V-belt, 1/2" Jacobs chuck	
Joiner 6", Serial No. 395688 Machine No. 230	6" X 5" blades (3) cord and plug	Dewalt Lancaster, Pennsylvania
Drill Press, Serial No. 002539, Model No. 1860	(1) V-belt (1) 220 volt cord & plug	Clausing, Div. of Atlas Press Co. Kalamazoo, Michigan
Craftsman Table Saw 8"	Belt, motor, rip fence	Sears Roebuck & Co. Chicago, Illinois
Band saw, Model No. 80, Serial No. 1172	Motor	Powermatic Woodworking Machinery Co. McMinnville, Tennessee
Band saw, Serial No. 000541, Type 800 ST	Blade	Centauro Fonderie & Officine Lemidi de Selura Madena, Italy

APPENDIX S



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