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A Proposed Industrial Arts Guide for Kusaie High School, Eastern Caroline Islands

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A PROPOSED INDUSTRIAL ARTS GUIDE FOR KUSAIE HIGH SCHOOL, EASTERN CAROLINE ISLANDS

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by

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CHAPTER I

THE PROBLEM AND DEFINITION OF TERMS USED

> Man is a Tool-using animal (Handthierendes Thier). Weak in himself, and of small stature, he stands on a basis, at most for the flattest-soled, of some half-square foot, insecurely enough; has to straddle out his legs, lest the very wind supplant him. Feeblest of bipeds! Three quintals are a crushing load for him; the steer of the meadow tosses him aloft, like a waste rag. Nevertheless he can use Tools, can devise Tools; with these the granite mountain melts into light dust before him; he kneads glowing iron, as if it were soft paste; seas are his smooth highway, winds and fire his unwearying steeds. Nowhere do you find him without Tools; without Tools he is nothing, with Tools he is all (3:34-35).

Prehistoric man has been hailed for the invention of a most valuable and functional tool: the wheel. Our forefathers have been praised for constructing our society with their functional tool: the axe. Modern society's tool is the computer. Thus, as man progresses, his tools become correspondingly more complex. As the complexity increases, man's knowledge and skills increase. One can find numerous examples to support this statement.

However, it is not accurate to conclude that all present societies are based on the computer as a common tool. There are still isolated areas in this world unique in their lack of progress. One such society is the Trust Territory of the Pacific Islands. This territory is located east of Guam in the Pacific Ocean, 130° to 170° longitude and 0° to 22° North latitude. It covers an ocean area of three million square miles.

Its 687 square miles of land area is unequally distributed between 2,141 islands (11:84).

Micronesia, as the anthropologists have named this area, has nearly 90,500 native inhabitants. There are also 400 American administrators living on the 96 inhabited islands (11:84). Nearly all the natives are farmers. Few of them speak English. All have known foreign domination. Under a United Nations agreement, these islands are in trust to the United States of America. Part of the trustship's obligation requires that the natives be adequately educated. ". . . promotion of their political, economic, social and educational advancement . . . and their progressive development towards self-government" (9:48).

As previously stated, the more advanced the society, the more advanced the tools, knowledge, and skill. The converse is also true. The more primitive the society, the simpler the tools. Here, then, is the problem of Micronesia and the United States. Micronesia is being forced to step into a highly mechanized and complex technical world. Yet the Micronesians' most used tool is the machete. Between the machete and the modern machine shop lies an ocean, both figuratively and literally. One major bridge across this ocean is education, and more specifically, industrial education. As H. H. London states,

> Unless workers in their respective occupations do their work well, improve their skills and technical know-how, and pass these on to succeeding generations, little social and economic progress

> can be made. Occupational efficiency, therefore, is essential to the well-being of both individuals and nations, and the person or nation that desires to advance in this competitive world must be occupationally competent (12:1).

The United States of America and the Trust Territory of the Pacific Islands are now sending skilled industrial educators to the islands in an effort to motivate and educate the natives of today's western mechanical age.

I. STATEMENT OF THE PROBLEM

The purpose of the study is to provide the writer an opportunity to propose an Industrial Arts guide for Kusaie High School, Trust Territory of the Pacific Islands. This particular guide has never been proposed for this high school. Kusaie High School is rapidly enlarging its enrollment, expanding its staff, and planning a new campus. To educate adequately the increasing number of students and effectively plan the new campus, an Industrial Arts guide is a paramount necessity.

Because many guides are currently available throughout the United States, the necessity of another guide has been questioned. It must be realized, however, that the existing guides do not and cannot meet the needs of students enrolled in Kusaie High School. The typical United States guide is not planned for the student whose immediate surroundings are lacking natural resources for industry. The Kusaien has only the sea to turn to for resources. His forty-two square mile volcanic island serves as an

agricultural stimulus rather than industrial. Present instructional guides are not planned for the student isolated from modern communication. The Kusaien has only recently had a dependable radio station on which to rely. He has no airplane service direct to his island and ship service is sporadic. The typical guide is planned for a population aware of modern technology. The Kusaien student has no electricity in his school nor does he have indoor plumbing in his home. The typical guide is not geared to reach the educationally immature Kusaien. Some Kusaiens will never leave this island which sits 150 miles from its nearest neighbor. The situation for the students of Kusaie High School is unique. The Industrial Arts guide must meet this unique situation.

II. IMPORTANCE OF THE STUDY

As the writer spent two years (1964-1966) teaching on Kusaie and the school year 1965-1966 teaching Industrial Arts, he found a definite need for such a guide. No Industrial Arts curriculum has been established. The continuity of the entire program depends upon the current teacher's skill and personal choice. Consequently, the students receive a disorganized and incongruous education in this area of study.

The materials needed for continuing the program are provided in the same unplanned and unorganized way. This wastes students' time, school funds, and slows down the attainment of goals in such a program. "There must be purpose and direction to the educational process" (24:5).

An explanation of the foundation of educational goals in the Trust Territory is essential to illustrate the importance of the study. The wheel and its hub are analogous to Trust Territory education. The hub is the core, the essential stability on which the wheel must depend to perform its job successfully. Three phases of Industrial Education--Industrial Arts, Agriculture, and Business Education--are the hub of Trust Territory education. The remaining areas--English, Social Studies, Math, and Science--are complements and supplements to this hub. As Thaine De McCormick stated in his address to the American Vocational Association, " . . . the very grass roots of the total Industrial Education program is Industrial Arts" (13:1). Such, then, is the purpose of this study: to get to the "grass roots" of an Industrial Education problem in Kusaie High School by proposing an Industrial Arts guide.

III. LIMITATIONS OF THE STUDY

The limitations of this study are great unless one can accept much of the writer's assumptions without a strong review of literature. There has been little written about the Trust Territory of the Pacific Islands. Periodicals are just beginning to feature this territory. A majority of Americans do not even know of this trustship (8:42). Consequently, the writer has had to depend upon generalizations to substantiate his points rather than concrete observations based on the culture itself. He has also had

to place himself in the role of expert because he is one of two persons who have ever taught Industrial Arts in Kusaie High School to date. Therefore, the writer realizes that this study is limited by the knowledge the reader has of Kusaie and its culture. He also admits the result of his study's success will not be realized until it is put into practice at Kusaie High School. Guides must be tried and tested before success is granted. Thorton states " . . . the evaluation of a curriculum must be done while it is in active operation" (24:304). What is true for the curriculum is imperative for the guide. So this study must have its trial in its proposed setting--a tiny island in Micronesia.

IV. DEFINITIONS OF TERMS USED

Curriculum. A detailed plan and specific schedule of a course of study.

Farmer. Any Micronesian who derives a major share of his livelihood from the cultivation of land. The methods are technically primitive (usually without benefit of simple tools such as the shovel) and scientifically innocent (generally with little knowledge about crop rotation, fertilization, etc.), producing little above subsistance for the man and his family.

Guide. The flexible outline of a broad subject area determining the direction of future curricula.

Industrial Arts. That part of general education which deals with materials, tools, processes, and products, as well as man's relationship with them as he lives in our industrial-technical society.

Industrial Education. The term designating the combined areas of Home Arts, Business Arts, Industrial Arts and Agriculture.

Island Industry. The only profitable Kusaien industry is the production and preparation of copra for the world market. A few cooperative efforts have recently been established in the fishing, farming, and building areas.

Kusaie. The island lying five degrees twenty minutes latitude and 163 degrees East longitude in the Trust Territory of the Pacific Islands.

Kusaien. The native inhabitants of the island of Kusaie.

Micronesia. The anthropological term meaning "small islands" that is used synonymously with Trust Territory of the Pacific Islands.

Micronesian. The native inhabitants of the Trust Territory of the Pacific Islands. To quote E. J. Kahn, Jr., "Micronesians have a mixed background, being a blend, most ethnologists agree, of Mongoloid, Caucasoid, Negroid, and Melanesian strains" (8:43).

Trust Territory. An abbreviated form of the title "Trust Territory of the Pacific Islands."

CHAPTER II

SUGGESTED IMPLEMENTATION OF THE GUIDE

Kusaie is unique in the age of technology. A vivid example of the island's technological innocence occurs nightly in the high school. The boarding students cluster around small kerosene lanterns to study. There is no electricity. Yet directly behind the school is a powerful waterfall that could generate enough hydroelectricity for the entire island. The girls wash their clothes by hand at the foot of the waterfall. The students bathe in the stream formed by the waterfall. A primitive water pipe services the campus kitchen. But in the centuries the water has fallen over the sharply-etched cliff, no Kusaien has made the power of the waterfall work for him.

Not only is Kusaie unique, but so are its inhabitants. Logically, the unique demands the unique. As Ruley eloquently writes,

> The industrial arts laboratory stands unique as a facility and setting in which all education can be brought together and synthesized. Functional industrial arts and teaching will exploit this uniqueness and extend its benefits to all ages and levels of learning. We should emphasize those things which industrial arts and no other area contributes to the education of youth (21:51).

To illustrate the desired emphasis of industrial arts in Kusaie High School, the following schedule of classes is suggested to obtain maximum exploitation of the uniqueness of the area.

FIRST YEAR

Required:	Introductory Mechanical Drawing	Boys and Girls
Electives:	None	

SECOND YEAR

Required:	Two or more
	Beginning Woods Beginning Metals Electricity
Electives:	Advanced Woods Advanced Metals Advanced Mechanical Drawing

THIRD YEAR

Required:	Complete A courses Choose one or more B courses
	A. Beginning Woods, Beginning Metals, Electricity B. Advanced Woods, Advanced Metals, Advanced Mechanical Drawing
Electives:	Any one of the above Individual Study

FOURTH YEAR

Required:	Complete required courses
Electives:	Individual Study

This schedule is based on the three-quarter system which has been established at Kusaie High School. The schedule would provide for each student the opportunity to attain the functions of the guide as quoted in Chapter III.

As the schedule illustrates, both girls and boys are required to take two classes of industrial arts their first year in high school. The girls will probably branch out to the Home Economics and Business Arts in later school years. Although a girl's parents have never bought a refrigerator, it is feasible that she might when she establishes her home. The only radio announcements she hears are government sponsored so she lacks exposure to commercialism as well as from lack of example at home. It is essential that the introductory class be required. Mechanical drawing is required because its principles are the basis for most manipulative work.

The second year student must take two of the three classes in Beginning Metals, Wood, or Electricity. He may elect to take the third or finish a sequence such as electing an advanced wood, advanced metal, or advanced mechanical drawing after completing the first class of the sequence.

The third year student must complete the beginning sequence. He must take one advanced class, therefore completing a sequence. He may elect to take any of the other sequence classes or may take an Individual Study specializing in a class where he has completed the sequence but is still desirous of more knowledge and skill.

The fourth year student must complete the required classes, giving him experience in all the areas of industrial arts. With any time he has left he can take an Individual Study in any area he wishes.

Following a hypothetical Kusaien boy through his four years of industrial arts should clarify the schedule. During his first year he will take the Introductory class plus the Mechanical Drawing. That is all that will be available to him that year because of the introductory classes he must take in Agriculture and Business Arts. His elective time must be used in perfecting his second language course in English.

The second year the boy will take Beginning Woods, Beginning Metals, and Electricity. His third year he chooses Advanced Woods, Advanced Metals, and an Individual Study in Woods. His fourth year he takes Advanced Mechanical Drawing to complete the required courses plus an extended Individual Study in Woods. During his Individual Study he completes a fishing boat from the design to the construction.

This example demonstrates how a student can follow his natural interests in any area but still have a well-rounded knowledge of all the related areas of industrial arts. It should be noted that the student who specializes in Business Arts or Agriculture would have the same required courses but would take his Individual Study time outside the industrial arts area.

The required classes meet five of the six functions stated by Olson (see Chapter III). Through the Introductory class and the following experience classes (Mechanical Drawing, Woods, Metals, and Electricity) the student should meet the goals of the Orientation, Avocational,

Consumer, Social, and Cultural functions. The Individual Study classes plus the elective subjects will amply meet the Technical function as well as overlap into other areas.

CHAPTER III

THE GUIDE

The guide serves as important directional aid in the forming of a curriculum. Without underlying principles and objectives, its value would be of little more than an organizational index. By whatever label chosen, principle, objective, or function, the guide becomes more than directional. It becomes foundational.

Delmar W. Olson has stated six functions which are essentially those accepted for this study.

> The Orientation Function. Experience in industrial arts should help the junior and senior high school pupil become better oriented in an industrial society by exploring many types of tools, materials, processes, products, and occupations (18:77).

As the Kusaien student is geographically isolated, so is he without knowledge of industrial societies. His only exposure is through the education he receives. Few will have opportunity to travel and orientate themselves first-hand. It is important, therefore, that the student be provided with the vocabulary of an industrial society, be made aware of the possible vocational opportunities, and become acquainted with the tools, materials, processes, and products of industry.

> The Technical Function. Industrial arts should provide as many opportunities as possible for pupils to spend at least a year in any phase of work where orientation may help to define specialized interests that can be pursued with profit (18:77).

As previously stated in the Orientation Function, the only exposure the Kusaien student will have to industry, in most cases, will be through his industrial arts classes. It is obvious that the experiences the student has first-hand in the classroom and the laboratory are vital and essential.

> The Avocational Function. Industrial arts also provides opportunities to cultivate a wide variety of useful, wholesome, and enduring leisure-time interests and activities (18:77).

The Kusaien, in his leisure-time, will fix his own kerosene lanterns, repair his house, build a pen for his animals, hew a canoe, and make his home life more comfortable. He must do this because his culture is not yet geared for service. Each man must take care of his own, and any improvements must be made by him. Therefore, it is essential that he have the skill to accomplish these leisure or spare-time activities.

> The Consumer Function. A primary purpose of industrial arts is to aid the individual in developing intelligent attitudes and understandings concerning the selection and use of the products of industry (18:78).

This function is particularly valuable because the Kusaien has not been exposed to the lures of advertising. In his own culture, advertising is unknown. He has had no example to follow because the import of goods is so recent that parents have had as little experience in purchasing as their children. It is of immediate value that the Kusaien be taught skillful buying, wise consuming, and good conserving.

> The Social Function. Experiences in industrial arts through activities in the shop or laboratory, as well as outside, should help the student develop desirable social habits and attitudes (18:78).

Industrial arts in Kusaie has the responsibility of developing the whole child. It should strive to develop in each student the habit of performing each task in an orderly, efficient, and complete manner. The knowledge that the island itself limits the travel and commerce of the culture does little to promote speedy delivery and efficient planning. There should be a correlation between mental and physical achievement. Kusaiens are unaware of the psychology of learning. A student who is socially and emotionally adjusted to his peers and the world society should emerge. The Kusaien must come to the realization that he is "island-bound" only geographically and only for the present, as transportation is improving.

> The Cultural Function. Experiences in industrial arts should help the individual enjoy a finer culture as regards materials in an involved technological society. This means helping him develop and use his material inheritance (18:78).

Industrial arts should help the Kusaien preserve what is left of his original culture and integrate it with the technological world he is entering. It should provide an awareness of the contribution of every race and country in the development of industrial materials, processes, and products for better living. It should develop an understanding and

an appreciation of industry, its methods and its influences, upon the Kusaien and his immediate society.

The total program should provide experiences to enable the student to understand and grow in talents needed in the technical fields and applied sciences. The student should be able to share in the establishment and maintenance of a home. He should be capable of understanding problem-solving skills related to materials and processes. He should be aware of proper service and maintenance procedures.

I. INTRODUCTION TO INDUSTRIAL ARTS

The purpose of the introductory class is to bring about an awareness in the student of the island industries and to enable him to compare local industry with western industry. It should show how western industry could improve island industry and in doing so, show the need for a background in practical arts. The course should not only illustrate how to improve existing industries, but also advance the development of other western-related island industries. As the relationship of island industry to western industry is drawn more closely together, there would develop for each student an acquaintance with the language and tools of industry. For example, when the teacher discusses pliers, each boy and girl should be able to identify it in his mind's eye. Further, the introductory course should provide a concentrated series in shop practices that will

influence the student's behavior and attitudes in later industrial arts experiences.

INTRODUCTION

I. Island Industry
   A. Copra
      1. Field maintenance
      2. Transporting
      3. Processing
      4. Marketing
         a. Value to Kusaien economy
         b. Value to world economy
      5. Equipment
   B. Fishing
      1. Need
      2. Methods
      3. Marketing
         a. Value to Kusaien economy
         b. Potential value to world economy
         c. Conservation
      4. Materials and equipment
   C. Other
      1. Public works
      2. Boat building
      3. Cooperative construction
      4. Lumber
      5. Fruit and vegetable trade with atolls

II. Western Industry
   A. Production
      1. Gathering of materials
         a. Raw
         b. Synthetic
      2. Methods of manufacture
      3. Methods of assembly
   B. Marketing
      1. Advertising
      2. Wholesale
      3. Retail

C. Service
   1. Maintenance
   2. Repair
   3. Replacement of parts

III. Shop Practice
   A. Safety
      1. Personal danger
         a. To others
         b. To equipment
         c. To self
      2. Correct use of tools
      3. Observation of safety rules
      4. First aid
   B. Measurement
      1. Shop arithmetic
      2. Metric system
   C. Care of tools
      1. Proper use of tools
      2. Maintaining good tool condition
      3. Safety with edged tools
      4. Protection of tools for tropical weather
      5. Storage of tools.

IV. Metals
   A. Metal and Industry
      1. Importance of metal to industry
      2. Importance of metal to the islands
      3. Production of metals
   B. Characteristics of Metal
      1. Definitions and classifications
      2. Comparison of various metals
      3. Uses of various metals
   C. Metal Tools
      1. Identification of hand tools
      2. Care and maintenance of tools
      3. Safe use of tools
   D. Metal Areas
      1. Bench metal work
      2. Sheet metal
      3. Welding and forging
      4. Heat treating
      5. Plumbing
      6. Machining

E. Power Mechanics
   1. Usefulness of engines
   2. Basics of internal combustion engine
   3. Care and maintenance of engines
   5. Other kinds of engines

V. Wood
   A. Wood in Today's World
      1. Modern wood industry
      2. Wood products
   B. Characteristics
      1. Growth of trees
      2. Types of wood
      3. Local woods
      4. Conservation of island woods
   C. Wood Tools
      1. Identification of hand tools
      2. Care and maintenance of tools
      3. Safe use of tools
   D. Wood Areas
      1. Carpentry
      2. Cabinet making
      3. Furniture construction
      4. Boat building

VI. Electricity
   A. Relationship of electricity to the modern world
      1. Uses of electricity
      2. Sources of electricity
      3. Importance of electricity to the islands
   B. Safety
      1. Danger in electric shock
      2. Danger of fire
      3. Protective devices in electricity
   C. Source of electricity
      1. Magnet
      2. Static and dynamic
      3. Possible island production
   D. Components
      1. Source
      2. Control
      3. Transmission
      4. Load

E. Common uses
   1. Function and maintenance of flashlight
   2. Radio
      a. Maintenance
      b. Antenna
      c. Grounding
   3. Simple wiring
   4. Small engine electricity

V. Home Health Mechanics
   A. Care and operation of household appliances
      1. Wick lamps
      2. Pressure lamps and irons
      3. Refrigerators and stoves (kerosene and gas)
   B. Maintenance of water catchment systems
   C. Maintenance of water faucets and simple plumbing
   D. Knotting and the use of ropes
   E. Binding and lashing with wire
   F. General maintenance of motor bikes
      1. Tightening of nuts
      2. Tire repair
      3. Body care
      4. Lubrication
   G. Sharpening edged tools
   H. Servicing door hinges and locks
   I. Repairing of screens
   J. Ordering parts

II. BEGINNING MECHANICAL DRAWING

The island student needs first to understand that he can communicate through mechanical drawing. Therefore, he needs to understand drawings and be able to express his ideas through drawings. He should gain an appreciation of the need for free-hand sketches as an aid to the verbal language. In doing so, his powers of visualization should increase.

In the beginning course, the student should learn proper use and care of his drawing tools. He should become acquainted with vocational opportunities in the field of drafting.

MECHANICAL DRAWING

I. Introduction
   - A. Importance
     1. International language
     2. Reading instructions
     3. Isometric of project
     4. Assembly
   - B. Standards
     1. Neatness and cleanliness
     2. Dimensioning
     3. Care of equipment
     4. Choice of paper and pencils
   - C. Instruments
     1. Selection of instruments
     2. Lining instruments
        - a. T-square
        - b. Triangles
        - c. Drawing board
     3. Circles and arcs
        - a. Compass
        - b. Protractors
        - c. Irregular curves
        - d. Flexible curves

II. Sketching and Lettering
   - A. Sketching
     1. Principles of design
        - a. Form
        - b. Proportion
        - c. Balance
     2. Basic lines
     3. Squares and rectangles
     4. Circles and arcs
   - B. Lettering
     1. Strokes
     2. Spacing
     3. Numerals and fractions
     4. Mechanical

III. Measuring and Dimensioning
  A. Measuring instruments
    1. Scales
    2. Templates
    3. Dividers
  B. Dimensioning lines
    1. Dimension line
    2. Extension line
    3. Arrowheads
    4. Centerlines
  C. Spacing and positioning
    1. Straight lines
    2. Arcs

IV. Constructions
  A. Geometrics
    1. Lines
      a. Bisect
      b. Divide
    2. Protractor
    3. Polygons
    4. Curves and ellipses
  B. Pictorial
    1. Oblique
    2. Isometric
    3. Perspective
  C. Orthographic
    1. Two-view
    2. Three-view
    3. Sectional views
    4. Auxiliary views
  D. Reproduction
    1. Scale drawing
    2. Tracing
    3. Reproduction machines

V. Maps, Charts, and Graphs
  A. Maps
    1. Plot
    2. Contours
    3. Topographic
    4. Hydrographic
    5. Landscape

B. Charts
   1. Pictorial
   2. Operation
   3. Organization
C. Graphs
   1. Bar
   2. Circle
   3. Line

III. BEGINNING METALS

In Beginning Metals the student needs knowledge of the historical background in metal design. He should become familiar with the types and properties of various metals. An interest and knowledge should develop in techniques, processes, materials, and products of the metalworking industry. Opportunity for gaining basic skills in the use and care of common metal working tools, machines, and materials should be provided. Safety in metals as well as their tropical limitations should be understood. Finally, the student should be aware of the occupational fields in metalwork.

BEGINNING METALS

I. Introduction
   A. Economics
      1. The industrial revolution
      2. Modern metal technology
      3. Limitations of metal
      4. Metals and the Space Age
   B. Metal industry
      1. Raw materials
      2. Production of metals

C. Safety
   1. Cleanliness
   2. Safety zones
   3. Flammables
   4. Clothing
   5. Handling and storage of materials
   6. First aid and emergency procedures

D. Characteristics
   1. Definitions and classifications
      a. Common metals
      b. Alloys
      c. Ferrous and non-ferrous metals
      d. Identification
   2. Mechanical properties

E. Care of tools
   1. Inspection
      a. Handles
      b. Heads
      c. General
   2. Sharpness
      a. Care of edge tools
      b. Sharpening
   3. Rust prevention
      a. In use
      b. In storage
      c. Cleaning

II. Bench Metals
   A. Design and Materials
      1. Development of plans
         a. Design principles
         b. Design elements
         c. Selection of good design
      2. Billing of materials
      3. Ordering materials
      4. Procedure
   B. Measuring and layout
      1. English and metric measurement
      2. Care and use of measuring equipment
         a. Rules
         b. Scales
         c. Squares
         d. Dividers

e. Calipers
f. Scribers
g. Protractor

3. Care and use of gauges
   a. Radius
   b. Thickness
   c. Wire
   d. Sheet metal
   e. Center
   f. Pitch
4. Care and use of layout tools
   a. Bench vise
   b. Hammer
   c. Prick punch
   d. Center punch
   e. Divider
   f. V-block

C. Assembly tools
1. Description and use
   a. Hammers
   b. Screwdrivers
   c. Wrenches, pliers, and clamps
   d. Punches
2. Metal fasteners
   a. Bolts
   b. Nuts
   c. Screws
   d. Washers
   e. Cotter pins
   f. Rivets
3. Peening and riveting

D. Drills and drilling
1. Classification of drills
2. Drilling machines
3. Drills
4. Work-holding devices
5. Speeds, feeds, and coolants
6. Safety
   a. Proper use
   b. Protective equipment

E. Threads
1. Basic principles
2. Types and dimensions
3. Taps and dies

F. Soldering
   1. Basic principles
   2. Alloys of solder
   3. Fluxes
   4. Heat sources
G. Abrasives and grinding
   1. Types and sizes of abrasives
   2. Buffing and polishing
   3. Grinding
      a. Types
      b. Tool sharpening

III. Finishing and Protecting
   A. Mechanical finishing
   B. Metal coating
   C. Organic coating
   D. Inorganic coating

IV. BEGINNING WOODS

The Beginning Woods student needs to be cognizant of the woods of the world. He needs to examine and compare these woods against the local woods. The student should be aware of the limitation of wood. He should learn the correct nomenclature in reference to hand tools. He should learn uses and care of hand woodworking tools in a safe manner.

BEGINNING WOODS

I. Introduction
   A. Economics
      1. Wood industry
      2. Role of wood technology in an improved standard of living
      3. Modern structural methods
   B. Wood industry
      1. Mass production methods
      2. Selection of materials and tools
      3. Sources of hard-to-get material

C. Safety
    1. Cleanliness
    2. Danger areas
    3. Storage of inflammables
    4. First aid and emergency procedures
D. Characteristics
    1. Woods
        a. Structure
        b. Local woods
        c. Imported woods
    2. Wood products
        a. Local
        b. Industrial
    3. Production
        a. Cutting down
        b. Grading
        c. Dimensioning
        d. Conservation
E. Care and use of tools
    1. Inspection of tools
    2. Sharpness
        a. Care of edge
        b. Sharpening
    3. Cleaning
    4. Storage

II. Designing and Planning
A. Job planning
    1. Understanding drawing and directions
    2. Developing procedure
    3. Materials
        a. List of materials needed
        b. Ordering
B. Measuring
    1. English and metric measurement
    2. Care and use of measuring tools
    3. Board measurement
C. Layout and marking
    1. Circles and arcs
        a. Compass and dividers
        b. Trammel points
        c. String method

2. Squares, rectangles, and angles
    a. Try-square
    b. Framing square
    c. Combination square
    d. T-bevel
3. Templates

III. Hand Tools
A. Sawing
1. Sawing straight line
    a. Hand saws
    b. Backsaw
    c. Miter box
2. Circles and arcs
    a. Coping saw
    b. Compass saw
    c. Keyhole saw
3. Sharpening and maintenance
B. Planning
1. Assembling and adjusting hand plane
2. Types and use
    a. Block
    b. Smooth
    c. Jack
3. Sharpening and maintenance
C. Cutting tools
1. Chisels and gouges
    a. Kinds
    b. Cuts
2. Spokesshave
3. Draw knife
4. Sharpening and maintenance
D. Scraping tools
1. Files and rasps
    a. Classification
    b. Cleaning
2. Scraper
    a. Uses
    b. Sharpening
3. Surform
4. Maintenance

E. Drill holes
    1. Tools
        a. Auger bit
        b. Expansion bit
        c. Foerstner bit
        d. Twist drill
        e. Sharpening
    2. Holding tools
        a. Hand drill
        b. Brace
    3. Maintenance

IV. Fabrication
A. Common joints
    1. Butt
    2. Edge
    3. Rabbet
    4. Dado
    5. Miter
    6. Lap
    7. Mortise and Tenon
B. Clamping and glueing
    1. Clamps
        a. Hand screw
        b. Bar
        c. C-clamps
    2. Jigs
        a. Use
        b. Construction
    3. Glueing
        a. Types
        b. Water-resistant
C. Driving tools
    1. Hammers
        a. Types
        b. Swing
        c. Pulling nails
    2. Screw drivers
        a. Kinds
        b. Sizes
    3. Maintenance

D. Fastening devices
    1. Nails
        a. Common types
        b. Selecting correct nail
        c. Pulling nail
    2. Screws
        a. Various kinds
        b. Selecting correct screw
        c. Selecting correct screwdriver
        d. Anchor, pilot, and countersink holes
E. Hardware
    1. Common hardware
        a. Hinges
        b. Catches
        c. Locks
    2. Selection of hardware
        a. Use
        b. Cost
        3. Ordering
    3. Installing hardware

V. Finishing
A. Importance of finishing
    1. Review wood characteristics
    2. Protection
        a. Weathering
        b. Damage
    3. Beauty
        a. Color
        b. Gloss
    4. Sanitation
B. Preparing Wood
    1. Wood scraper
    2. Abrasive paper
        a. Correct grit
        b. Sanding blocks
    3. Repairing wood surface
        a. Plastic wood
        b. Wood putty
    4. Raising of grain

C. Procedures
   1. Stains
      a. Oil
      b. Water
   2. Filling
   3. Types of finishes
      a. Shellac
      b. Varnish
      c. Oil
      d. Paints
      e. Lacquers
   4. Application
      a. Brushing
      b. Spraying
   5. Care and storage of supplies
      a. Brushes
      b. Finishes

V. ELECTRICITY

A student of Electricity must first understand electrical concepts and theory. He should become acquainted with electrical fundamentals and gain experience in manipulating and caring for the tools, equipment, and materials peculiar to electrical work. He should develop ability to understand, select wisely, buy intelligently, and properly care for electrical products. He should learn how to make simple repairs on small electrical appliances.

ELECTRICITY

I. Introduction
   A. Economics
      1. History of electricity
      2. Uses of electricity
      3. Electronics

B. Electricity industries
   1. Power suppliers
   2. Appliances
   3. Motors
   4. Electronics
   5. Space age

C. Safety
   1. Correct procedures
   2. Check before turning on
   3. Never mix water and electricity
   4. Never use worn or broken equipment
   5. Observe all safety rules
   6. First aid

II. Nature of Electricity

A. Electron theory
   1. What are electrons
   2. Charges of electrons
   3. Movement of electrons

B. Types of electricity
   1. Static
      a. Electrostatic charge
      b. Effects
   2. Current or dynamic
      a. Current
      b. Voltage
      c. Resistance
      d. Power
      e. Energy

C. Component sections of electricity (14:5)
   1. Source
      a. Supply
      b. Symbols
   2. Control
      a. Conductor, non-conductor
      b. Switch
      c. Symbols
   3. Transmission
      a. Circuits
      b. Conductors
      c. Schematics
      d. Symbols

4. Load
    a. Uses
    b. Symbols

III. Magnetism
A. Laws of magnetism
    1. Rotation of electrons
    2. Magnetic and non-magnetic materials
    3. Force field
    5. Polarity
B. Types of magnets
    1. Natural
        a. Lodestone
        b. Earth
    2. Artificial
        a. Bar
        b. Horseshoe
        c. Ring
    3. Electromagnets
        a. Coil
        b. Solenoid, relay, buzzer
        c. Shields

IV. Production of electricity
A. Chemical
    1. Dry cell
    2. Wet cell
    3. Mercury battery
    4. Storage battery (rechargeable cell)
B. Mechanical
    1. Basic principles
    2. Types of generators
    3. Power plants
    4. AC-DC
C. Light
    1. Light vibrations
    2. Photoelectric
    3. Solar cells
D. Heat
    1. Thermocouple
    2.

V. Control and Transmission
  A. Conductors and insulators
    1. Conductors
      a. Use
      b. Kinds
      c. Splicers
    2. Insulators
      a. Use
      b. Kinds
  B. Circuits
    1. Series
    2. Parallel
    3. Series-parallel
    4. Wiring technique
    5. Soldering technique
  C. Voltage current and resistance
    1. Voltage
      a. Electromotive force
      b. Voltmeter
        (1) Range
        (2) Polarity
        (3) Hook up
    2. Current
      a. Amperage
      b. AC-DC
        (1) Range
        (2) Polarity
        (3) Hook up
    3. Resistance
      a. Ohms
      b. Ohms Law

VI. Household Electricity
  A. Home safety
    1. Body as a conductor
    2. Fire safety
    3. Short circuit
    4. Overloads
  B. Circuit protection
    1. Fuses and circuit breakers
    2. Switches
    3. Outlets
    4. How electrical appliances work
    5. Loads

C. Circuitry and wiring
   1. Layout
   2. Loads
      a. Lighting
      b. Utility
   3. Circuit controls
   4. Wiring systems
      a. Knob and tube
      b. Non-metallic sheathed cable
      c. Armored cable
      d. Conduit
   5. Grounding
   6. Electrical code

VII. Electricity and Communication
   A. Telegraph
      1. Principles
      2. Components
      3. Circuits
   B. Telephone
      1. Principles
      2. Components
         a. Transmitter
         b. Receiver
      3. Circuit
   C. Radio
      1. Transmission
         a. Basic principles
         b. Battery
      2. Receiving
         a. Antenna-ground system
         b. Tuning
      3. Amplifications
      4. Power supplies

VI. ADVANCED MECHANICAL DRAWING

The Kusaien student in Advanced Mechanical Drawing should deepen his appreciation of good workmanship in drawing. This deepening

of appreciation should reinforce the habit of careful and thoughtful work. To achieve this, the student should habitually use an orderly method of procedure. Through experience, the student's powers of visualization should increase. He should be able to evaluate design. He should gain an attitude of pride in his ability to execute good drawings. He should be aware of opportunities in the field of drafting.

ADVANCED MECHANICAL DRAWING

I. Review
   - A. Introduction
     1. Importance
     2. Standards
   - B. Sketching and lettering
     1. Sketching
     2. Lettering
   - C. Measurement and dimensioning
     1. Measuring instruments
     2. Dimensioning lines
     3. Spacing and positioning
   - D. Shape descriptions
     1. Geometric
     2. Pictorial
     3. Orthographic
     4. Reproductive
   - E. Maps, charts, and graphs

II. Sections
   - A. Purpose and kinds
     1. Full section
     2. Half section
     3. Offset section
     4. Revolved sections
   - B. Use of sections
     1. Cutting plane lines
     2. Symbols

III. Auxiliary Views and Revolutions
  A. Purpose of auxiliary view
  B. Purpose of revolutions
  C. Partial views

IV. Developments
  A. Parallel lines
  B. Radial lines
  C. Triangulation

V. Industrial Drawing
  A. Kinds
    1. Pipe
    2. Welding
    3. Electrical
    4. Fastenings
  B. Symbols
    1. Pipe
    2. Welding
    3. Electrical
    4. Fastenings

VI. Architectural Drawing
  A. Basic construction
    1. Foundation
    2. Walls and roof
    3. Architectural symbols
    4. Elevations
    5. Plot plans
  B. Floor plans
    1. Rooms
    2. Electrical
    3. Plumbing

VII. ADVANCED METALS

The student in Advanced Metals should have the opportunity to enjoy the satisfaction of accomplishment through analyzing, planning, and executing practical metal projects of good design. He should be

introduced to a variety of fields in metalwork for leisure time activities, home upkeep, and future vocational application.

ADVANCED METALS

I. Review
   A. Review introduction of Beginning Metals
      1. Economics
      2. Metal industry
   B. Safety
      1. Cleanliness
      2. Safety zones
      3. Flammables
      4. Clothing
      5. Handling and storage of materials
      6. First aid and emergency procedures
   C. Characteristics
      1. Definition
      2. Mechanical properties
   D. Care of tools
      1. Inspection
      2. Sharpness
      3. Rust prevention
   E. Bench metals
      1. Design
      2. Measuring and layout
      3. Assembly
      4. Drills and drilling
      5. Threads
      6. Soldering
      7. Abrasives
      8. Finishing

II. Sheet Metals
   A. Pattern development and layout
      1. Sheet metal materials
      2. Pattern development
         a. Parallel line
         b. Radial
         c. Triangulation
      3. Use of patterns and templates
      4. Layout tools

B. Cutting
   1. Hand
   2. Machine
   3. Safety
C. Forming
   1. Hole making
      a. Punching
      b. Drilling
      c. Holding metal
   2. Forming
      a. Hand
      b. Machine
      c. Hems
      d. Seams
D. Assembling
   1. Soldering
   2. Rivets
   3. Sheet metal screw
   4. Welding
E. Finishing
   1. Protective coating
   2. Paints
   3. Enamels
F. Water catchment systems
   1. Roofing systems
   2. Hanging gutters
   3. Fitting tanks

III. Plumbing
A. Introduction
   1. Purposes of plumbing
   2. Basic systems
   3. Tools
B. Types of pipe
   1. Uses
      a. Water supply
      b. Drain
   2. Steel pipe
      a. Uses
      b. Standard fitting
   3. Copper tubing
      a. Uses
      b. Fitting

(1) Flared
(2) Soldered

4. Cast iron pipe
   a. Uses
   b. Fitting
   c. Installing

C. Planning home plumbing
   1. Water distribution
   2. Fixtures
   3. Drainage

IV. Welding
   A. Introduction
      1. Fundamentals of welding
      2. Types of welding and equipment
      3. Selection of equipment
      4. Welding and matallurgy
      5. Symbols and specifications
   B. Gas welding
      1. Basic principles
      2. Safety
         a. Welding equipment
         b. Protective equipment
      3. Machines
         a. Set up
         b. Choice and adjustment of equipment
      4. Preparation of metals
      5. Starting and maintaining puddle
      6. Cleaning and protection
      7. Cutting
   C. Electric welding
      1. Basic principles
      2. Safety
         a. Welding equipment
         b. Protective equipment
      3. Arc welding machines
      4. Types of electrodes
      5. Welding operation
         a. Preparation of metal
         b. Selection of amperage
         c. Striking arc and running bead
         d. Various positions
      6. Cleaning and protection of metal

D. Brazing
   1. Basic principles
   2. Safety
      a. Welding equipment
      b. Protective equipment
   3. Brazing equipment
   4. Brazing rods and fluxes
   5. Preparation of metal
   6. Heat control
   7. Cleaning and protection of metal

V. Forging and heat Treating
   A. Introduction
      1. Basic principles
      2. Types of forging
      3. Effects of heat and hammering to metal
         a. Various metals
         b. Metallurgy
   B. Forges and Tools
      1. Forges
         a. Parts
         b. Fuels
         c. Use
      2. Anvils
         a. Parts
         b. Care
         c. Use
      3. Hand tools
         a. Holding
         b. Shaping
         c. Cutting
   C. Processes
      1. Drawing
      2. Shaping and forming
      3. Cutting and punching
      4. Welding
   D. Heat treating
      1. Review metals
         a. Classifications
         b. Identifications
         c. Properties

2. Carbon steel
    a. Carbon content
    b. Heat treatment
        (1) Critical temperature
        (2) Hardening
        (3) Tempering
        (4) Annealing
    c. Case hardening

VI. Power Machines
  A. Hand power tools
    1. Use
    2. Maintenance
    3. Drill
    4. Sanders and grinders
  B. Drill press
    1. Description
    2. Maintenance
    3. Speeds
    4. Holding of metal
    5. Safety
  C. Lathe
    1. Description and function
    2. Maintenance
    3. Cutting tools
    4. Operations
  D. Shaper
    1. Description and function
    2. Maintenance
    3. Cutting tools
    4. Operations
  E. Milling
    1. Description and functions
    2. Maintenance
    3. Cutters
    4. Operations

VII. Power Mechanics
  A. History of power
    1. Man
    2. Wind
    3. Water

4. Heat engine
    a. External combustion
    b. Internal combustion
5. Nuclear energy

B. Basic mechanisms
1. Simple machines
    a. Levers
    b. Wheel and axle
    c. Inclined plane
    d. Pully
    e. Wedge
    f. Screw
2. Power transfer
    a. Pulley and belt
    b. Sprocket and chain
    c. Cams and eccentric
    d. Gears

C. Gasoline engine
1. Types of engines
    a. Two stroke
    b. Four stroke
2. Principles of operation
    a. Carburation
    b. Compression
    c. Ignition
3. Mechanical system
    a. Component parts
    b. Functions and operations
    c. Types of cylinder arrangement
    d. Maintenance
4. Fuel system
    a. Fuel tanks and lines
    b. Fuel pumps
    c. Carburetors
        (1) Purpose
        (2) Function
5. Ignition systems
    a. Component parts
    b. Functions and operation
6. Lubrication
    a. Purposes
    b. Types
    c. Function and operation

VIII. ADVANCED WOODS

The student of Advanced Woods should have first hand experience in woodworking and its related areas. Verbalization of his experiences through proper usage of standard vocabulary should be gained. He should be aware of standard United States methods of wood construction as well as island practices.

ADVANCED WOODS

I. Review
   - A. Review introduction of Beginning Woods
     1. Economics
     2. Wood industry
   - B. Safety
     1. Cleanliness
     2. Danger areas
     3. Storage of inflammables
     4. First aid and emergency procedures
   - C. Characteristics
     1. Woods
     2. Wood products
     3. Production
   - D. Care and use of tools
     1. Inspection
     2. Sharpness
     3. Rust prevention
   - E. Designing and planning
     1. Measuring
     2. Layout
   - F. Hand tools
     1. Sawing
     2. Planing
     3. Cutting
     4. Scraping
     5. Drills

G. Fabrication
   1. Joints
   2. Clamping and glueing
   3. Driving tools
   4. Fastening devices
   5. Hardware

H. Finish
   1. Importance of finishing
   2. Preparing wood
   3. Procedures

II. Carpentry

A. Tools
   1. Reading framing square
   2. Level
   3. Rules

B. Foundations
   1. Lay out
   2. Excavating
   3. Form construction
   4. Leveling
   5. Tying, spacing, and reinforcing
   6. Mixing
   7. Pouring and tamping
   8. Stripping and curing

C. Framing
   1. Foundation
      a. Footing
      b. Bearing posts
      c. Bracing
      d. Sills
      e. Beams
   2. Wall and floor frame
      a. Joints
      b. Bridging and blocking
      c. Rough flooring
      d. Wall plates
      e. Corner construction
      f. Studs
      g. Partitions
      h. Door and window framing

3. Roof frame
    a. Types of roofs
    b. Ridge
    c. Common rafters
    d. Hip and valley
    e. Jack
    f. Ties and ceiling joints
4. Painting and finishing
    a. Preparation
    b. Materials and thinners
        (1) Sealing
        (2) Varnishes
        (3) Enamels
        (4) Lacquers
        (5) Priming and sealing
        (6) Finish painting
        (7) Care and cleaning of equipment

III. Concrete
A. Introduction to concrete use
    1. Common uses
        a. Slabs
        b. Foundations
        c. Blocks
    2. Strength
    3. Life time
B. Forms
    1. Layout
    2. Excavating
    3. Form construction
    4. Leveling
    5. Spacing and reinforcing
C. Mixing and placing
    1. Mixing to specifications
        a. Preparation of coral sand
        b. Dry mix
        c. Wet mix
    2. Placing and protecting
        a. Pouring
        b. Tamping
        c. Troweling
        d. Floating
        e. Curing

IV. Boat Building
- A. Importance of boat building
  - 1. Historical
  - 2. Local need
- B. Tools
  - 1. Special tools
  - 2. Laying of lines
  - 3. Use of templates
  - 4. Transfer of patterns
- C. Fabrications
  - 1. Use of jigs
  - 2. Fastenings
  - 3. Joinery
  - 4. Glues
  - 5. Caulking
- D. Finishing
  - 1. Varnishing
  - 2. Plastic
  - 3. Fiberglass

V. Plastic and Fiberglass
- A. Survey of plastic industry
  - 1. Development of plastic industry
  - 2. Local uses of plastics and fiberglass
- B. Types of plastic
  - 1. Thermosetting
  - 2. Thermoplastic
- C. Forms of plastic materials
  - 1. How plastics can be purchased
  - 2. Sources of plastic materials
  - 3. Cost of materials
- D. Designing in plastics
  - 1. Basic design considerations
  - 2. Functional limitations of plastic materials
  - 3. Transferring design to materials
- E. Fabricating processes
  - 1. Use of wood and metal tools
  - 2. Sanding and polishing
  - 3. Heat forming
  - 4. Cementing and bonding
  - 5. Heat welding

F. Casting process
    1. Phenolic
    2. Polyester
G. Fiberglass
    1. Uses
    2. Laminates
        a. Polyester resin
        b. Catalysts
        c. Cloth, mat
    3. Trimming and sanding

IX. INDIVIDUAL STUDY

The purpose of the Individual Study is to provide the student an opportunity to delve into a specific area in greater depth and breadth. To accomplish this objective, the student might work in the industrial arts laboratory under the specific and individual guidance of the teacher. It is possible for a student to be given released time away from the school campus to gain first-hand experience by assisting Public Works in the specific area of his study. It is also possible for a student to arrange his program enabling him to take two concurrent or successive individual studies, therefore providing him with insight and integration of two areas of specialization.

CHAPTER IV

SUMMARY AND CONCLUSION

I. SUMMARY

From the beginning of human existence, man has been judged on his ability to control and improve his environment. Words such as "sophisticated," "civilized," and "cultured" express the complexity to the tools man invented to establish control and further improvement. Conversely, "backward," uncivilized," and "innocent" describe those areas of inhabitation which have not controlled and improved their environment to any great degree.

Not so very long ago, many underdeveloped areas were recognized as centers of civilization. Now they are cities, boosting the surrounding countryside to a level of sophistication. Indeed, today exist few areas of inhabitation that are still judged "uncivilized" because of their lack of industrial growth.

The island of Kusaie in the Trust Territory of the Pacific Islands is one such area innocent of major technological advances. The machete instead of the computer is this small society's most dependable and efficient tool. This island plus the rest of Micronesia is entrusted to the United States of America by the United Nations. The trustship includes the

responsibility of educating the Micronesians to a level where they may be self-governing in a modern technological world.

The purpose of the study is the development of an industrial arts guide for Kusaie High School. As the school and its students are unique, a guide tailored exactly to their needs is necessary. The universal attributes of industrial arts are exploited. The unique features of industrial arts and its application to a specific island culture is stressed.

The study gains stature when one discovers there is no industrial arts guide or curriculum for Kusaie High School. It gains importance when one realizes the basis for the entire educational program of the high school is based on Industrial Education. All other subjects act as complements of Industrial Education.

The limitations of the study are great in that much of the foundation is not supported by a review of literature. This weakness is due to the fact that so little has been written about the Trust Territory in general, Kusaie specifically. The writer spent two years on the island teaching, one year at the high school in industrial arts. Therefore, much of the study is based on personal experience, initiated by island need and supported by the universal and unique qualities of industrial arts to improve standards of living.

The guide provides a foundation upon which an industrial arts curriculum can be built. It also serves as a directional aid while the

curriculum is being formed. It secures the subject area, assuring all students the same opportunity for knowledge in the industrial arts area rather than relying on the whim and skill of the current teacher.

Delmar W. Olson has stated six functions of industrial arts which the guide accepts as essentially vital for the Kusaien student. The Orientation function introduces the student to the various areas of industrial arts. The Technical function gives the student opportunity to complete a project in a specialized area from design through construction. The Avocational function provides the student with enough skill that he may maintain and improve his home. The Consumer function aids the student in skillful buying, wise consuming, and good conservation of industrial products. The Social function develops desirable habits and attitudes in the student and improves his relationship with the group. The Cultural function helps the student make his culture a finer place to live.

In addition to these six functions, the guide seeks to develop a socially and emotionally better Kusaien. It strives to develop an understanding of technological societies beyond the island and an appreciation for all industry. It provides experiences for the student to become a better Kusaien, a better Micronesian, and a better world citizen.

The guide consists of nine units. Each unit has specific objectives and is designed to meet the various needs of the Kusaien High

School student. The first unit of study is the Introduction course. The students are provided an overview of industrial arts in this class. The second unit is Beginning Mechanical Drawing where the students can learn communication through drafting. The third unit, Beginning Metals, deals with a familiarization of metal, its advantages and disadvantages on a tropical island, and introductory metal-working skills. Beginning Woods introduces the student to woods, both local and imported, its uses, limitations, and the basic woodworking skills. The student of Electricity learns, primarily, the concepts and theories as well as elementary manipulation of electricity.

The Advanced Mechanical Drawing class broadens the scope of the beginning course emphasizing good workmanship, orderly procedure, and increased powers of visualization. In Advanced Metals the student is provided the experience of analyzing, planning, and executing practical metal projects of good design. Advanced Woods provides the student first-hand experience in woodworking, carpentry, boat building, concrete working, plastics and fiberglass. The Individual Study provides opportunity for the student to deepen and broaden his knowledge and skill in one particular area either on or off the school campus.

A suggested usage of the guide completes the study. These suggestions are based on the three quarter system and deal with the

exploitation of the unique qualities of the industrial arts guide in the equally unique high school on Kusaie, Eastern Caroline Islands.

II. CONCLUSIONS

The guide does not stop with this study. It is open-ended. It is hoped that teachers in Micronesia will change, reword, and cross-out the various units until the original is not recognizable. At that point, perhaps a good curriculum will emerge.

The guide can be analyzed and improved over a desk, but it cannot be termed successful until followed in the tropical setting of Kusaie itself. It has been aimed at the current needs of the Kusaien student. Conceivably, in a few years time the students will have progressed enough to make this particular guide obsolete. Until that time, however, the guide will provide direction, foundation, and continuity.

With some revision this guide could help persons working in other technologically deprived cultures. A study of the Appendix will illustrate the need for this type of guide in several of the South Pacific cultures. It is also conceivable that the guide could have implications for the more primitive cultures in Africa, South America, and perhaps the American Indians.

The fulfillment of immediate objectives can be recognized at the close of each unit. The meeting of the functions can be evaluated

at the end of each sequence of classes. But the final analysis of the guide cannot be made until Kusaiens are rejudged on their ability to control and improve their environment. Perhaps, more importantly, an evaluation will be what kind of world citizens Kusaiens become.

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APPENDIX

TONGA COLLEGE,
'ATELE.

Box 49,
NUKU' ALOFA,
TONGA.
2 February, 1967.

Mr. M. H. Lindquist,
Muzzall Hall,
Ellensburg,
Washington, U. S. A.

Dear Mr. Lindquist,

The Director of Education has passed your letter on to me and asked that I reply direct to you.

I would be delighted to be able to help you in developing your program for Trust Territories of the Pacific Is. Unfortunately, we are in probably the same position as you are for our workshop is only in the process of being built, and the scheme of work that we envisage is in the same position. We expect both to be finished at about the same time, that is at about the end of April. If you would like our scheme then, we would be happy to send it to you.

The only thing I will say about things at the moment is that we expect the work to be very simple and very practical. We do have a large farm to run as well (and it has to supply the food for the College) and we are going to tie in various aspects of the work with this.

I wish you the best of luck in your work and would be delighted to hear from you again. Meanwhile, thanks for the postage, but in these circumstances I return it with pleasure in your generosity.

Yours sincerely,

/s/ Reese C. Forbes

R. C. FORBES,
PRINCIPAL.

Enclosed: $1.00

DEPARTMENT OF EDUCATION
SUVA, FIJI

AHC/rt
In Reply Please Quote:
E43/6-IV/207.

9 February, 1967.

Malcolm H. Lindquist Esq.,
Muzzall Hall,
Central State College,
Ellensburg,
Washington,
UNITED STATES OF AMERICA.

Dear Sir,

I refer to your letter of 25th January, 1967 in which you enquire concerning the teaching of industrial education in Fiji at secondary school level.

It is a little difficult for me to attach a specific meaning to the terminology you use as ours is so very different. As you will see by reference to page 7 of the enclosed Annual Report for 1965, Industrial Education is dealt with in two main parts:-

(i) Educational Handcraft & Homecraft,
(ii) Technical & Vocational Education.

Educational Handcraft and Homecraft consists of the subjects woodwork, metalwork, technical drawing, needlework, cookery, housecraft, mothercraft etc., which are taught as a part of the general curriculum at upper primary and secondary levels (i.e. from the sixth to the twelfth years of school attendance). There is no vocational content in these courses although they provide valuable diagnostic experience and have some part in determining the career which a child leaving school may then choose to pursue. I have enclosed three books relating to the course in woodwork which is used in the sixth, seventh and eighth years of school attendance (i.e. as an initial course) and also a squared paper technical drawing scheme which is used in the same classes. Beyond this point teachers devise their own schemes of work based on normal examination syllabuses. It is my intention eventually to have a parallel scheme for the teaching of metalwork but this has not yet been put into production.

Technical and Vocational Education as you will see from the annual report is concerned with vocational training in a variety of fields. The courses in use for trade apprentices are those prepared for apprentices in New South Wales. Details of these courses can probably be obtained from the following addressee:-

The Director,
Department of Technical Education,
Farrer Place,
Sydney,
New South Wales,
AUSTRALIA.

Vocational courses in commercial subjects are either locally prepared courses designed for the most part to meet the needs of clerical Civil Servants, or those of the Royal Society of Arts, 18 Adam Street, Adelphi, London W.C.2.

I hope that the above information is of assistance. This letter will come to you by official mail and I am therefore returning herewith the $1.00 which you sent to cover postage.

Yours faithfully,

/s/ A. H. Chadwick

for Director of Education.

GOVERNMENT OF THE COOK ISLANDS

Ref. C. I. Ed. 8/1/10

Education Department,
Rarotonga, 7 April 1967

AIRMAIL

Mr. Malcolm H. Lindquist,
Muzzall Hall,
Central Washington State College,
Ellensburg,
Washington
U. S. A.

Dear Mr. Lindquist,

Thank you for your letter of 25 January. I regret the delay in answering, but mail is notoriously slow in this part of the world.

You are correct in your statement that we run a woodwork programme, and we are about to introduce simple metalwork. However, our programme has been experimental until this year, and we are in the process of producing a finalised programme and sets of teaching notes, instructions, diagrams, syllabus, etc. These will be forwarded to you as soon as they are completed, probably in about three months.

Yours faithfully,

/s/ J. W. Taylor

(J. W. Taylor)
Director of Education.

GILBERT AND ELLICE ISLANDS COLONY,
EDUCATION DEPARTMENT.
Bikenibeau, Tarawa.
1st April, 1967.
F: 3/1/9

M. H. Lindquist, Esq.,
Muzzall Hall
Central Washington State College
Ellensburg,
Washington, U.S.A.

Syllabuses in Woodwork

Dear Sir,

I refer to your letter of 25th January where you ask for details of our Industrial Education programme.

At present there is one Government secondary school serving the whole of this Colony. It caters for 130 boys and 80 girls. Entrance to the school is by competitive examination at 13 years of age. There are two forms in each of the first three years; at the end of the third year pupils take the Colony Junior School Certificate examination, after which more than half leave school. This examination also forms an entrance examination for participation in fourth and fifth year secondary studies leading to the University to Cambridge Overseas School Certificate/G.C.E. Examinations. In addition to the Government secondary school, there are two Catholic and one Protestant secondary schools which have three year courses leading to the Colony Junior School Certificate Examination, and whose pupils are eligible for entry to the Government school fourth and fifth forms, depending on their performance in the Colony Junior School Certificate Examination.

Enclosed is a copy of the Woodwork syllabus for the five year secondary school course. This is the only course which could be considered as "Industrial Training."

All other education is provided for in Primary schools, both Government and Mission. At the moment these cater for pupils from six to sixteen years of age. However, there are proposals that primary education should be for six years to be followed by two years of "Secondary General" schooling for all pupils other than those going to the selective

academic secondary schools. This Secondary General course will be aimed at establishing a break in school life coinciding with the natural change in a child's life and providing a curriculum that prepares the bulk of young people for adolescence and adult life in their own environment.

The Secondary General scheme is still awaiting approval in respect of the funds necessary to implement it. However, a syllabus of practical courses for both boys and girls has been drawn up and I enclose a copy herewith.

I hope these details will assist you in your work; moreover we would be interested to receive a copy of your programme when completed.

I must apologise for unavoidable delay in replying.

Thank you for enclosing one Dollar to cover postage; it is returned herewith as this letter will be despatched O.H.M.S..

Yours sincerely,

/s/ J. W. Harding

(J. W. Harding)
for Chief Education Officer.

TERRITORY OF PAPUA AND NEW GUINEA

Department of Education
KONEDOBU
14 March, 1967.

Mr. Malcolm H. Lindquist,
Muzzall Hall,
Central Washington State College,
ELLENSBURG, WASHINGTON, U.S.A.

Dear Sir,

With reference to your enquiry of the 25th January, concerning technical education, I am pleased to provide the following information.

Secondary level education in this Territory follows two broad streams after a primary course of seven years including one year preparatory schooling. The two streams are:-

(i) High Schools. These provide a four year programme, a copy of which is attached for your information.

(ii) Technical Schools which provide

(a) Two years pre-apprenticeship training by full time study.

(b) A further two years "continuous" training during which time the student completes the normal apprenticeship schooling (technical drawing, trade theory and trade practice) of his chosen trade, together with general studies in English, Mathematics, Science and simple commercial principles. This period is followed by an indentureship of two or three years' duration.

(c) Apprenticeship training by "block release." Indentured apprentices attend a boarding trade school for a "block" course of 5 to 8 weeks duration. There is one "block" course" per year, the remainder of the year's studies being by correspondence and being a consolidation and revision of the work done at the "block course."

(d) Three years' Certificate Courses in Mechanical Engineering, Building Construction or Commerce. These courses are still very much in the developmental stage.

Syllabuses for the courses covered under (i) above are enclosed. Whilst these are currently under review, they may assist you to gauge the type of work being covered.

If any of the syllabuses for technical schools are of interest to you, we would be happy to forward them.

Yours faithfully,

/s/ K. R. McKinnon

(K. R. McKINNON)
Director of Education