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A STUDY OF THE WORK FUNCTIONS  
OF NIGERIAN INDUSTRIAL TECHNICIANS

by

Olugbenro A. Ajayi

A thesis presented to the  
Faculty of the School of Graduate  
Studies in partial fulfilment  
of the  
Degree of Masters of Arts

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## CHAPTER 1

### THE PROBLEM AND ITS BACKGROUND

#### Introduction

A curriculum can be developed in several ways. The simplest method is to use the curriculum of another institution without modification. The hazard of such an approach lies in the possibility that the curriculum may not be a good one or, even if satisfactory for the original institution, may not fit into the conditions of the setting where it is to be used. For example, entrance requirements for institutions vary from country to country and from one institution to another.

Another method is to study a number of curriculums and develop a composite curriculum embodying the best points of all of them. The difficulty sometimes encountered with this method is that the resulting programme may not constitute a complete integrated curriculum. Probably the most effective method is to use an approach which depends on up-to-date analyses of the occupations with which the programme is concerned and the development of a curriculum based on these analyses. In this approach, the stated objectives of the institution are considered and on the basis of the occupations analysed, an inductive reasoning process is

used to determine the knowledge, skills, and other factors which should be included in the curriculum in order to achieve the objectives.

This study represents an attempt to apply refined occupational analyses to the Nigerian situation. It is the hope that this study might provide data to help clarify the problems related to the construction and evaluation of curriculum for Nigerian industrial technicians without specifically detailing programmes and courses in the process.

#### Purpose Of The Study

The aim of this study of Nigerian industrial technicians is to: (1) describe the nature of industrial technician work, that is, describe in what activities are technicians engaged and to what extent; (2) reveal a common core or base in the work functions of industrial technicians.

#### Scope Of The Study

It is recognized that certain personal characteristics are also desirable in these occupations; that much of the technician's work requires an understanding of social and economic factors, a good knowledge of industrial organization, and acceptable attitudes. In developing the items of the survey instrument, however,

it was considered advisable to use the more impersonal characteristics of the technician's work in order to obtain maximum objectivity.

There is no doubt that there may be considerable merit to sampling the opinions of technicians themselves on many of the same questions which were put to their supervisors. However, the advantageous positions of wider overview and relationships from which supervisors can appraise the role and work of technicians seem more valuable in non-observational situations. Further, use of non-observational (interviews or questionnaires) technique for gathering information about functional activities from the job incumbents is likely to elicit bias tending to increase the prestige value of the job.

In this study the word 'industry' is used as a generic term covering all areas of engineering technological employment. A technician is taken as an incumbent of a technical occupation intermediate between the craftsman or tradesman and the professional engineers and scientists. Generally, a prerequisite of special training subsequent to secondary school education is assumed for all technician jobs. No validated criteria for differentiating between levels of technician activity has been found. As such, no attempt is made to differentiate between levels of technician activity in this study.



## Setting Of The Study

Geographically, Nigeria is situated on the Gulf of Guinea in West Africa, and covers an area of 360,000 square miles, a size about one and a half times that of Texas. According to the latest census, the population is some 55.6 millions. Nigeria became independent in 1960. The country is subdivided into four political regions (states), and a federal capital city of Lagos.

Responsibility for education is shared between the Federal and Regional Governments. The Federal Government assumes the major responsibility for university education, as well as total responsibility for all types of education (including technical education) in the federal area of Lagos. The Regional Governments have the residual responsibilities for education in their respective regions, these include technical education. The Federal Government and the Regional Governments have established and operate colleges for technical education. The colleges are of the post-secondary-school type and the curriculums run for two academic years.

The Technical College, Ibadan is one of later and regionally owned colleges for technical education. The survey covers an area which approximately coincides with the service area for which the college assumes, or aspires to assume a share of responsibility (appendix A).

## CHAPTER 2

### THE METHOD OF THE STUDY

This study was carried out in two stages. In the first stage, an attempt was made to determine the variety of technician types employed in the service area of The Technical College, Ibadan. For this stage, the questionnaire technique was used and a sample of the questionnaire used, "Preliminary Information Form", is provided in appendix B. For the second stage an interview technique was used for a sample of the respondents to the first stage.

#### Development Of The Survey Forms

The preliminary information form (appendix B) was designed to find out the variety of technician types in employment in the service area and the size of the industrial plants in which they work. Also since the survey form itself is comprehensive and long, the preliminary information was used to find out which industrial concerns were interested enough in the survey to provide the cooperation necessary for gathering information.

The survey form (appendix C) is partly a modification of one used in a pilot interview-type survey in the

Benton Harbor - Saint Joseph area of Michigan<sup>1</sup>.

However, the main bulk (part III) is radically different. The grouping of activities around categories like equipment, instruments, materials, etc., introduces the possibility of some activity being associated with more than one category, and not being identified as such. For example, an activity associated with the production of a particular equipment and using certain special instruments will appear in two or more categories without the link being obvious. Instead, general statements of distinct activities of technicians have been written and space has been provided for use in recording the equipment, instruments, tools and materials associated with these activities. In addition, provision has been made for recording two separate indices of the frequency of performance of these activities and their relative importance. It is considered that part of the requirements in devising curriculums or courses for technicians is knowing which activities are performed at all, although the relative frequency of performance enables a better visualisation of the jobs.

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<sup>1</sup>Brandon, George L., Twin City Technicians. East Lansing, Michigan: College of Education, Michigan State University, 1958. Pp. vii + 70.

Also, it is considered that one useful index of importance in establishing curriculum priorities, is the period of time after which a freshly graduated technician is expected to assume the activity. It is possible that some activity that is not demanded of technicians immediately may well be omitted from a curriculum if the technician can learn it on the job. A list of the functional categories are given on page 2a and the rating scales for the indices are on page 2b of the survey form (appendix C).

The deductions of needed understandings and skills are probably best made by technical educators from sufficiently detailed description of technician activities. As such the survey form does not include any questions as to the necessary understandings and skills. An important aspect of the format in which the description of activities have been requested, is that the possibility of introducing bias to increase the prestige value of the jobs or otherwise, has been considerably reduced.

#### Selection Of The Sample

The first stage of the study was designed to cover the range of all industrial economic activities. To obtain names and addresses for this purpose, lists of industrial firms were sought from the Economics and

Statistics Division, Federal Ministry of Commerce and Industry, Lagos. Only one list<sup>1</sup> was available, that of major manufacturing plants in Nigeria. In this list, the establishments are classified according to product categories of the International Standard Industrial Classification of All Economic Activities (ISIC)<sup>2</sup>.

The nature of this classification is that : "The ISIC is a classification by kind of economic activity (or industry) and not by kind of occupation or commodity. The classification does not draw distinctions according to kind of ownership, type of economic organisation or mode of operation." Since this is a comprehensive classification the risk of overlooking an important manufacturing activity will be reduced. This list obtained does not cover the broad categories of the service industries and government departments. To obtain information covering these, a commercial directory<sup>3</sup>, and telephone directories of Lagos and the

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1

\_\_\_\_\_, Industrial Directory. Lagos, Nigeria: Federal Ministry of Commerce and Industry, 1964. Pp. 25.

2

\_\_\_\_\_, International Standard Industrial Classification Of All Economic Activities, Statistical Papers Series M No. 4, Rev. 1. Statistical Office of the United Nations, United Nations, New York, 1958. Pp. iii + 27.

3

\_\_\_\_\_, Commercial Directory And Quarters List. Ibadan, Nigeria: The Ibadan Chamber of Commerce, 1964. Pp. 20.

major towns in Western Region were used. The commercial directory is published by the Ibadan Chamber of Commerce and only those companies who are members of the Chamber are included. Lists giving the types of products of, and the types of service provided by the companies selected for contact are given in appendix E.

Each completed Preliminary Information Form that was returned was examined primarily with respect to the official title of the technician and the starting salary for the position. If in spite of the official title the starting salary quoted for the technician was about the same as for a fresh secondary school leaver, the form was treated as pertaining to a non-technician post. The logic is that employers would offer technicians more for their additional training than they would offer fresh school leavers. For the second stage of the survey, interviews were arranged only with respondents whose completed Preliminary Information Form passed the check.

#### Administration Of The Survey Forms

The Preliminary Information Forms were mailed out each with a forwarding letter (appendix B). The forwarding letter was signed jointly by the Principal and the Chairman of the Advisory Board to the Technical College Ibadan. With each form also went a stamped

and addressed envelope for reply. In all, two-hundred and twenty four Preliminary Information Forms were mailed out in the third week of August 1964.

It had been anticipated that the interviews (in the second stage) would be conducted by the investigator and interested members of the teaching staff at The Technical College, Ibadan. In addition to projected instructions about the purposes and scope of the survey to prospective interviewers, a "Guide to Interviews" (appendix D) was written. It was hoped that these would help standardize the conduct of the interviews. It was planned that no volunteer interviewer would be asked to conduct more than half a dozen interviews.

The interviews were started by the investigator on the 1st of September 1964. On the basis of experience gained with the first few interviews, it was decided that it took as much as half a dozen interviews for an interviewer to get the feel of things. As such the idea of using a team of volunteer interviewers was scrapped and the investigator conducted all the interviews personally.

## CHAPTER 3

## FINDINGS

The information from the Preliminary Information Forms have been organised in three broad categories. The categories are of manufacturing industries, service industries and government departments. Apart from a summary of findings common to all types of technicians, the survey results are organised according to technician types.

Of the two hundred and twenty-four Preliminary Information Forms sent out, sixty-three were returned completed. Out of those returned forty-two were selected for contact.



Preliminary Information Findings  
From The Replies Of  
Manufacturing Industries

A. Nature of industries or products:

Aluminium and aluminium products; Boat building and marine engineering; Brewing; Ice cream; Motor vehicle assembly; Plastics; Sewing thread; Soap, toilet preparations, edible oils and fats; Soft drinks.

B. Number of technicians employed and the number of industries employing them:

1 to 5 technicians 8; 6 to 10 technicians 4;  
11 to 20 technicians 1; over 20 technicians 2.

C. Total number of employees presently in all engineering, technical and craftsman categories, and the number of industries employing them:

1 to 20 employees 5; 21 to 50 employees 4;  
51 to 100 employees 1; over 100 employees 4.

D. Typical official titles:

Aluminium engineer, Assistant engineer, Draughtsman, Factory superintendent, Foreman, Production engineer, Production supervisor, Technical assistant, Technical supervisor.

E. Range of starting salaries (per annum):

225 to 600 Nigerian pounds (sterling).

Median starting salary; 384 Nigerian pounds.

Preliminary Information Findings  
From The Replies Of  
Service Industries

A. Nature of service:

Architectural planning; Broadcasting; Building and civil engineering consulting; External Telecommunications; Importation and distribution of petroleum products; Motor vehicle distribution and service; Steel structures design and fabrication.

B. Number of technicians and the number of businesses employing them:

1 to 5 technicians 2; 6 to 10 technicians 3;  
11 to 20 technicians 1; over 20 technicians 3.

C. Total number of employees presently in all engineering, technical and craftsman categories, and the number of businesses employing them:

1 to 20 employees 2; 21 to 50 employees 2;  
51 to 100 employees 1; over 100 employees 4.

D. Typical official titles:

Assistant engineer, Draughtsman, Engineer assistant, Foreman, Service engineer, Technical assistant, Technical supervisor, Technical watchkeeper, Works supervisor.

E. Range of starting salaries (per annum):

240 to 528 Nigerian pounds (sterling).

Median starting salary; 360 Nigerian pounds.

Preliminary Information Findings  
From The Replies Of  
Government Ministries And Departments

A. Nature of businesses:

Architectural and building; Chemical analysis and investigation; Electricity supply, Forest research; General engineering; Industrial research and advisement; Maintenance of plant and vehicles; Map reproduction; Public works construction and maintenance; Ship-building and repairs; Surveying.

B. Number of technicians and the number of establishments employing them:

1 to 5 technicians -; 6 to 10 technicians 2;  
11 to 20 technicians 1; over 20 technicians 9.

C. Total number of employees presently in all engineering, technical and craftsman categories, and the number of establishments employing them:

1 to 20 employees 1; 21 to 50 employees 1;  
51 to 100 employees 1; over 100 employees 9.

D. Typical official titles:

Assistant technical officer, Assistant works superintendent, Laboratory technologist, Radio mechanic, Technical officer, Telephone mechanic, Works superintendent.

E. Range of starting salaries (per annum):

303 to 684 Nigerian pounds (sterling).

Median starting salary; 471 Nigerian pounds.

Survey Findings  
Relevant To All Technician Types

From the preliminary information findings, forty-two contacts were made with an aim of obtaining interviews. Of these, eight had misinterpreted the working definition for a technician and it was found out from preliminary discussions that they in fact did not have the personnel of interest on their staff, besides, two others flatly refused to grant interviews. Thus thirty-two interviews were conducted and the average time per interview was twenty-eight minutes.

Typical titles of persons interviewed:

Assistant production manager; Chief chemist; Chief engineer, Senior engineer, Engineer - Civil, Electrical or Mechanical; Plant supervisor; Power station superintendent; Research officer; Technical instructor; Works superintendent.

Qualifications of the respondents to give information about technicians:

Except for two technical instructors interviewed all the others were in supervisory relation to the technicians.

Total number of technicians that the respondents work with: 102.

Attitudes of persons interviewed:

By and large the attitudes checked according to

the check list on the last page of the survey form (appendix C) were favourable, with the exception of a couple of respondents who had not been long in their positions and were checked inexperienced.

Written job descriptions:

Only the government departments had brief job descriptions listing the duties of their technicians. All the others did not have any.

#### Survey Findings On Civil Engineering Technicians

- I. General information (locating and identifying the Technician).
  - A. Types of business or industry where found:

Civil engineering consulting; Civil engineering survey and design; Laboratory for testing soils and building materials, and for investigating foundation conditions; Public works construction and maintenance; Structural steel fabrication and erection.
  - B. Typical occupational titles for this type of technician:

Assistant technical officer (building), Assistant technical officer (civil), Draughtsman/Estimator, Structural draughtsman, Technical officer.
  - C. Total number of these technicians the respondents work with: 26.

- D. The departments where these technicians primarily work:

Design and development, Construction planning, Construction supervision, Installation and maintenance.

## II. Job description and work activities

- A. Preventive maintenance on:

Public buildings and residences (including building fittings); water systems; (control of construction of) roads and embankments.

- B. Original installation of:

Water systems; Boilers; Hydraulic systems; Public and residential buildings plus their fittings.

- C. Inspection of:

Surveying instruments; Materials testing machines; concrete mixers; road making machinery; Building materials - cement, aggregates and timber; road making materials - aggregates and asphalt; Carpentry products.

- D. Production of engineering drawings of:

Foundations, floors, walls and other structural details of buildings; site plans; sewers and pumping stations; these include detailed drawings of sections of beams, columns, slabs, and steel structural members from architectural drawings.

E. Operation of:

California bearing ratio machines, Cube crushing machines, Materials testing machines, Equipment for testing moisture content and dry density.

F. Plans, establishes and implements (through directives to others) work methods, procedures, and performance standards in connection with:

Preventive maintenance, Original installation or replacement of equipment (including construction of buildings), Inspection of equipment and materials, Production of engineering drawings, and Operation of equipment.

G. Design of:

Road layouts, small buildings - including simple roof trusses and columns, Supports and wall brackets for light loads, Sewer lines.

H. When on building site as representative, inspects, evaluates and reports on supervised maintenance and other activities to ensure:

- (1) Adherence to approved work methods and procedures,
- (2) Adherence to established standards of performance,
- (3) Adherence to priorities assigned.

I. Organizes, supervises, and evaluates personnel i.e:

- (1) Develops organisational structure, plans work flow, and assigns personnel to sections and teams;
- (2) Orients newly assigned personnel;
- (3) Assigns work to subordinates;
- (4) Assists subordinates in interpreting and applying

technical information and directives;

- (5) Evaluates and maintains records of the performance of individuals and teams.

Designations of subordinate personnel:

Foremen - carpentry, Road overseer, Technical assistants, Laboratory attendants.

J. Performs administrative duties i.e.:

Maintains files.

K. Performs liason with other departments and suppliers:

- (1) Models plans for control purposes on site;
- (2) Corresponds with other departments;
- (3) Represents department in meetings with suppliers.

L. Estimation i.e.:

Schedule of materials written after drawing sections of structural members. Estimation of materials arising from a design. Cost in terms of labour, materials and time for accomplishment.

M. Surveying of:

land contour, new roads and routes for pipelines.

III. Supervision received:

Most civil engineering technicians receive work assignments at the completion of the previous one.

IV. Miscellaneous information:

Majority of the businesses and departments provide 'training within industry' for this type of technician, usually in the form of supervised on-the-job training.



Evening courses suggested for the improvement of technicians include: Materials testing procedure; Concrete design; Management and industrial psychology.

Average interview time was twenty-three minutes.

### Survey Findings On Electrical Technicians

#### I. General information (locating and identifying the technician)

##### A. Types of business or industry where found:

Electricity supply, Public works and maintenance,  
Industrial installation and maintenance.

##### B. Typical occupational titles for this type of technician:

Assistant engineer, Assistant technical officer,  
Technical officer.

##### C. Total number of these technicians the respondents work with: 9.

##### D. The departments where these technicians primarily work:

Construction supervision, Technical distribution  
and service, Installation and maintenance.

#### II. Job description and work activities

##### A. Troubleshooting, Dismantling, Major overhaul, and Original installation of:

Generating sets - diesel type; medium and low  
tension switchgear; substations; overhead lines

and underground cables; plant distribution switchboards; domestic and hospital electric appliances - including refrigerators, and air conditioners; industrial appliances - electric motors with starters for water and sewage pumps, electric motors in automatic production machines, welding equipment; motor vehicle electrical systems; street lights.

B. Inspection and preventive maintenance of:

Electrical switchgear - oil in switchgear for acid and moisture content; transformers - filtering of oil; domestic electric appliances; industrial electric motors and diesel engines - oiling and greasing, ensuring non-dampness of electric motors, power plugs and switches; control gear - test operation of thermostats and overload tripping devices, motor vehicle electrical systems - battery checks, ignition systems; street lights.

C. Prescribed modification of:

Lighting circuits for offices and residences.  
Adaptation of motor vehicle electrical components from one model to the other - starter pinions, brushes etc.

D. Calibration, adjustment and alignment of:

Motor vehicle regulator cut-outs, horns, contactors on starters, headlamps, and ignition components;

time switches for street lights; kilowatt-hour meters, ammeters and voltmeters.

E. Inspection of:

Cables, wires and other electrical fittings and hardware; spare parts for domestic appliances and motor vehicle electrical equipment; sodium lamps, and their accessories.

F. Production of engineering drawings of:

Geographical layout of an area - with overhead lines and underground cable networks, and finding route lengths of lines and cables; wiring diagrams.

G. Operation of:

Diesel engines, boilers and turbines; generating plants - putting generators on load by running up to speed and synchronising machines; medium and low tension switchgear and fusegear; electric motors, metal-working machines; plumbing equipment - for conduit-type installations.

H. Plans, establishes, and implements (through directives to others) work methods, procedures, and performance standards in connection with:

Troubleshooting; inspection and preventive maintenance; dismantling; major overhaul; original installation; calibration, adjustment and alignment; and operation of equipment.

I. Inspects, evaluates and reports on supervised maintenance and other activities to ensure:

- (1) Adherence to approved work methods and procedures;
- (2) Adherence to established standards of performance;
- (3) Adherence to priorities assigned;
- (4) Adequacy of preventive maintenance and minor repair done on equipment and tools used;
- (5) Appropriate utilisation of manpower, test equipment, supplies, and space resources;
- (6) Adequate financial control involving the estimation of labour and time on costs.

J. Organizes, supervises, and evaluates personnel:

- (1) Develops organizational structure, plans work flow and assigns personnel to sections and teams;
- (2) Orients newly assigned personnel;
- (3) Assigns work to subordinates;
- (4) Assists subordinates in interpreting and applying technical information and directives;
- (5) Evaluates and maintains records of the performance of individuals and teams.

Designations of subordinate personnel:

Foremen, Workshop supervisors, Linesmen, wiremen, fitters, plumbers and cable jointers.

K. Performs administrative duties:

- (1) Maintains files;
- (2) Schedules unit work loads and evaluates work priorities.

L. Performs liason with other departments and clients;

(1) Corresponds with clients and other departments;

(2) Represents department in meetings or conferences with suppliers, clients and other departments.

M. Instruments used:

Multimeters, phase rotation indicators, test lamps, strobo-torch lights, hydrometers, earth testing meggers.

III. Supervision received:

Practice varies between the establishments, in some, electrical technicians initially receive general assignment of duties, and subsequently special work assignments, while in others, they receive new work assignments at the completion of previous work assignment.

IV. Miscellaneous information:

Most of the establishments do not provide 'training within industry', those who do have supervised on-the-job training.

Personnel management was the only subject suggested as suitable for technician evening classes.

Average interview time was thirty-one minutes.

Survey Findings On  
Electronic Technicians

I. General Information (locating and identifying the technician)

A. Types of business or industry where found:

Radio and television broadcasting, Continental and trans-Atlantic telecommunications.

B. Typical occupational titles for this type of technician:

Engineering assistant, Technical assistant, Technical watchkeeper.

C. Total number of these technicians the respondents work with: 40.

D. The departments where these technicians primarily work:

Installation and maintenance, Watchkeeping - operation of equipment for normality.

II. Job description and work activities

A. Troubleshooting of:

Power supply faults; Telegraph transmission and reception line equipment; Radio transmitter and receivers; Radio telephone equipment; FM - voice frequency telegraph equipment.

B. Preventive maintenance on:

Cinema and telecine projectors; Thermionic valves; Gains of amplifiers (video and r.f.); Telegraph transmission and reception line equipment; Radio

Transmitters and receivers; Radio-telephone equipment; FM - voice frequency telegraph equipment.

C. Dismantling of:

Modular units of television cameras, and video amplifiers; Telecine equipment - mechanical drives; Telegraph transmission and reception line equipment; Radio transmitters and receivers; Radio telephone equipment; FM - voice frequency telegraph equipment.

D. Calibration, adjustment and alignment of:

Video, r.f. and a.f. amplifiers; Telecine projectors; Picture and waveform monitors for linearity, brilliance, and contrast; Calibration of oscilloscopes and waveform monitors; Crystal oscillators, voltage adjustment of line power, lining up voice frequency oscillator and amplifier; Relay and other basic mechanical adjustments.

E. Operation of:

Telecine and slide projectors; Television cameras; Disc reproducers; Tape recorders; Video and audio dimmer controls; Teleprinters; Perforators; Radio control position for telex; Radio receivers and transmitters; Starting and warming up of telecommunication equipment - tuning in and running up transmitters.

F. Instruments used:

Multimeters, vacuum-tube voltmeters, oscilloscopes valve testers and signal generators.

III. Supervision received:

When on watchkeeping duties (operation of equipment for normality) electronic technicians receive general assignment of duties, and subsequently special work assignment. When on maintenance duties, they receive work assignments at the completion of the previous work assignment.

IV. Miscellaneous information:

All the establishments provide supervised on-the-job training for their electronic technicians. More advanced topics in telecommunication principles, and radio and line transmission have been suggested as suitable for technician evening classes.

Average interview time was twenty-six minutes.

Survey Findings On  
Mechanical (Maintenance) Technicians

I. General information (locating and identifying the technician:

A. Types of business or industry where found:

General maintenance and construction, Motor vehicle service.

B. Typical occupational titles for this type of technician:



Assistant maintenance supervisor, Assistant technical officer, Service engineer, Technical officer.

C. Total number of these technicians the respondents work with: 15.

D. The departments where these technicians primarily work:

Production supervision, Construction supervision, Technical sales and service, Installation and maintenance.

## II. Job description and work activities

A. Troubleshooting, Inspection, Preventive maintenance, Dismantling, Major overhaul, and Prescribed modifications of:

Petrol engine motor vehicles; Diesel engines - caterpillar bulldozers, tractors, pumps, electrical generating plants; Refrigerators; Air conditioners and air conditioning ducts; Air compressors; hydraulic mobile cranes; Road rollers; vibrating rollers; Metal-working machines; Electrical switchgear and cabling.

B. Calibration, adjustment and alignment of:

Motor vehicles; Diesel engines; Pumps; Wheels, brakes, chassis, headlamps, ignition systems; Safety valves on air compressors and pumps; Injector nozzle and valves in diesel engines; Blades on bulldozers.

C. Maintenance and repair of:

Metal-working machines; Garage hydraulic cranes; Compression testers; Electrical testers; and other motor vehicle service equipment.

D. Inspection of:

Metal bars and rods; sheet metal; mild steel plates; welding materials; spare parts; timber planks; glass; paints; lubricants.

E. Production of engineering drawings of:

Machine parts; Structural parts; Modifications to existing systems.

F. Operation of:

Metal-working machines; Welding equipment; Motor vehicles; Tractors and bulldozers.

F. Plans, establishes, and implements (through directives to others) work methods, procedures, and performance standards in connection with:

Troubleshooting, Inspection, Preventive maintenance, Dismantling, Major overhaul, and Prescribed modifications.

G. Inspects, evaluates and reports on supervised maintenance and other activities to ensure:

- (1) Adherence to approved work methods and procedures;
- (2) Adherence to established standards of performance;
- (3) Adherence to priorities assigned;
- (4) Adequacy of preventive maintenance and minor repair done on equipment and tools used;

- (5) Appropriate utilisation of manpower, test equipment, supplies, and space resource.

H. Organizes, supervises, and evaluates personnel:

- (1) Develops organisational structure, plans work flow, and assigns personnel to sections and teams;
- (2) Orients newly assigned personnel;
- (3) Assigns work to subordinates;
- (4) Assists subordinates in interpreting and applying technical information and directives.

I. Performs administrative duties:

- (1) Maintains files;
- (2) Determines requirements for tools, machinery, equipment, supplies, workspace;
- (3) Schedules unit work loads and establishes work priorities.

J. Performs liason with other departments and clients;

- (1) Corresponds with suppliers and other departments;
- (2) Represents department in meetings with suppliers and other departments;
- (3) Arranges transport for other departments.

K. Instruments used:

Compression testers, alignment gauges, pressure gauges, electric testers, halide lamps, diesel injection testing equipment, wheel balancing gauges, welding equipment, hand tools, feeler gauges.

### III. Supervision received:

These technicians initially receive general assignment of duties, and subsequently special work assignment.

### IV. Miscellaneous information:

All the departments and businesses contacted organize 'training within industry' for this type of technician. Two of them in the form of supervised on-the-job training, one provides formal classes for six weeks and yet another makes it possible for the prospective technician to spend a year at the works before going to college. The one evening course for technician improvement that has been suggested is Management. Average interview time was thirty-six minutes.

## Survey Findings On Mechanical (Production) Technicians

### I. General information (locating and identifying the technician)

#### A. Types of business or industry where found:

Brewing; Industrial research; Manufacture of plastic goods, soft drinks, soap, detergents toilet and edible oils and fats.

#### B. Typical occupational titles for this type of technician:

Assistant engineer, Factory superintendent,

Foreman, Production engineer, Production foreman,  
Technical officer (drawing office).

C. Total number of these technicians the respondents  
work with: 8.

D. The departments where these technicians primarily  
work:

Production development, Production supervision,  
Installation and maintenance.

II. Job description and work activities

Troubleshooting, Inspection, Preventive maintenance,  
Dismantling, Major overhaul, and Original  
installation of:

Pumps, Compressors; Refrigerating plants; Production  
and processing machines; Prototype production  
machines; Metal-working machines.

B. Production of engineering drawings i.e.:

Developing finished drawings from freehand  
sketches of various prototype production machines  
for industrial research; copying working drawings.

C. Operation of:

Production and processing machines; Metal-working  
machines.

D. Plans, establishes, and implements (through directives to others) work methods, procedures, and  
performance standards in connection with:

Preventive maintenance, Dismantling, and Major  
overhaul.

E. Inspects, evaluates and reports on supervised maintenance and other activities to ensure:

- (1) Adherence to approved work methods and procedures.
- (2) Adherence to established standards of performance.
- (3) Adequacy of preventive maintenance and minor repair done on equipment and tools used.

F. Organizes, supervises, and evaluates personnel:

- (1) Develops organisational structure, plans work flow, and assigns personnel to sections and teams;
- (2) Orients newly assigned personnel;
- (3) Assigns work to subordinates;
- (4) Assists subordinates in interpreting and applying technical information and directives on new equipment or new production batches;
- (5) Evaluates and maintains records of the performance of individuals and teams.

G. Performs liason with other internal departments:

- (1) Corresponds with other departments;
- (2) Represents department in meetings with other departments.

III.. Supervision received:

Practice varies, some technicians receive general assignment of duties, and subsequently special work assignment; others receive new work assignment at the completion of previous work assignment.

IV. Miscellaneous information:

None of the industries contacted have any organized

'training within industry'.

The only evening class for technician improvement that has been suggested is in Toolmaking and Die-making, and that by a respondent in a plastic goods factory.

Average interview time was twenty minutes.

### Survey Findings On Science Laboratory Technicians

- I. General information (locating and identifying the technician)
  - A. Types of business or industry where found:  
Industrial research laboratory for the development of foods and food products, Chemical analysis laboratory for the investigation of foods, drugs, poisons and water supplies, Paint and paint products development laboratory.
  - B. Typical occupational titles for this type of technician:  
Assistant technical officer, Laboratory technician.
  - C. Total number of these technicians the respondents work with: 4.
  - D. The departments where these technicians primarily work:  
Design and development, Production supervision, Chemical analysis.
- II. Job description and work activities
  - A. Inspection i.e.:

Testing chemically processed water from municipal waterworks; testing foods, drugs, and poison - tests involving volumetric and gravimetric analysis, and simple identifications.

Inspecting food products for quality - that is for moisture, protein, fibre and cyanide contents, and free acid tests.

Testing finished paints and raw materials for paints, i.e. petroleum derivative solvents, plastics, pigments and fungicides; including tests for volatile content of paints, drying out tests and determination of refractive index.

B. Operation of:

Burettes, pipettes, Ph meters, various proprietary comparators, water pumps, pilot plants for research projects, and viscosity measurement equipment.

III. Supervision received:

Practice varies from laboratory to laboratory, in some, technicians receive general assignment of duties and subsequently special work assignment; while in others, technicians receive work assignment at the completion of the previous work assignment.

IV. Miscellaneous information:

Supervised on-the-job training is provided in all the establishments contacted, in addition one of



them provides formal classes in subjects of special significance to the laboratory work.

Short duration full-time courses in special subjects have been suggested as beneficial to the technicians. It has been suggested also that for highly specialised subjects, the instructors could be drawn from relevant laboratories while using college teaching facilities.

Average interview time was forty-five minutes.

++ TABLE I

'Median Indices' On All Work Functions For Each  
Type of Technician

Functions	Technician types					
	Electrical	Mechanical (Maintenance)	Mechanical (Production)	Civil	Electronic	Science Laboratory
Operation of equipment	F/0	O/0	S/0	F/1/2	F/0	F/0
Preventive maintenance	F/1	F/1	S/0	F/3	R/0	-
Original installation	O/6	R/6	F/0	F/6	-	-
Inspection of equipment	S/6	F/3	R/3	R/0	-	-
Engineering drafting	F/0	R/0	R/0	F/0	-	-
Planning of work etc.	F/0	F/3	F/3	F/6	-	-
Supervision of activities	F/6	F/3	F/0	F/6	-	-
Personnel organisation	F/6	O/3	F/6	F/6	-	-
Liason	R/6	F/0	F/6	O/6	-	-
Inspection of materials	F/6	S/0	-	F/6	-	F/0
Troubleshooting	F/1	S/6	F/3	-	F/0	-
Dismantling	O/6	S/0	F/0	-	F/0	-
Major overhaul	R/1	S/6	S/1	-	-	-
Calibration etc.	O/0	O/0	-	-	O/0	-
Administrative duties	F/6	F/0	-	S/6	-	-
Prescribed modifications	F/6	R/6	-	-	-	-
Test equipment maintenance	-	R/0	.-	-	F/0	-

TABLE I. (continued)

	Technician types					
	Electrical	Mechanical (Maintenance)	Mechanical (Production)	Civil	Electronic	Science Laboratory
Estimating	-	-	-	F/O	-	-
Surveying	-	-	-	F/O	-	-
Design and Construction	-	-	-	F/O	-	-

TABLE I (cont.)

## \*\* Rating Scales

For each work function there has been indicated:

## I. Frequency of activity;

- F - FREQUENCY, Many times a day or for most of the working day
- O - OFTEN, as much as four or five times a day on the average
- S - SOMETIMES, as much as four or five times a week on the average
- R - RARELY, not more than once a week on the average
- N - NEVER

## II. That activity assumed after;

- 6 - Over six months
- 3 - Three months
- 1 - One month
- $\frac{1}{2}$  - Two weeks
- 0 - 0 - (Immediately)

For each entry, (i.e. F/6) the letter indicates the frequency of activity and the number the period after which the activity is assumed.

## CHAPTER 4

## CONCLUSIONS

The nature of the findings of the frequencies with which work functions are performed and the periods of time after which full responsibility for them is assumed, is such that even though the pattern may be clear for each technician type, a general summary covering all technician types is difficult. A few things are clear though, and one is that work functions of a managerial nature (i.e. planning, supervision, organisation and liason) are not assumed until after some considerable time and thereafter with the highest 'frequency' of many times a day. Others are that although the respective 'frequencies' may vary from one technician type to the other, the operation of the various equipment and the production of engineering drawings are two work functions that technicians are expected to be competent in when they arrive in industry. It is worthy of note that inclusive on the list of various equipment operated by almost all technicians are metal-working machines.

If a common core of work functions are those activities that are performed at all, and irrespective of frequency, a general summary is easier.

The science laboratory technician seem to have very little in common with the others as regards work functions. That apart, the common core of work functions seem to consist of operation and preventive maintenance on equipment. When only the electrical, mechanical and civil engineering technicians are considered, the common core includes original installation, inspection, engineering drafting and the 'managerial' work functions. Whereas troubleshooting and dismantling are common to the group of electrical, electronic and mechanical engineering technicians.

Of the list of functional categories written, two items: the design of, and the fabrication of test equipment and tools have not been found to be applicable to any technician type. On the other hand two items have had to be added to the list for civil engineering technicians. These are estimating and surveying.

#### Recommendations

It is doubtful whether a rigid set of guiding principles in the use of the findings for the purposes of curriculum planning or evaluation is worthwhile. This is because such curriculum planning or evaluation would depend in part on how many engineering technologies are to be covered by the curriculum, and also on

the philosophy of technical education held by the institution concerned.

However, in deciding an order of priorities of the occupational objectives of technical education for a particular type of technician, two lists in descending order of significance may be written. Such lists are given below for electrical technicians.

#### Work functions of electrical technicians

Performed:	Assumed after:
<u>Frequency;</u>	<u>Immediately;</u>
Equipment operation	Equipment operation
Preventive maintenance	Engineering drafting
Engineering drafting	Calibration
'Managerial' functions	<u>One month;</u>
Materials inspection	Preventive maintenance
Troubleshooting	Troubleshooting
Prescribed modifications	Major overhaul
<u>Often;</u>	<u>Six months;</u>
Original installation	Original installation
Dismantling	Equipment inspection
Calibration	Managerial functions
<u>Sometimes;</u>	Dismantling
Equipment inspection	Prescribed modifications.

The arrangements of the work functions in the two lists may sometimes be conflicting.

Such is the case with the positions occupied by the 'managerial' work functions in the two lists above. In order to arrive at a single list of the order of priorities, a lot of compromise may be necessary.

It will be presumptuous to say the findings of this survey are representative of Nigerian industry. There are two limitations, one is due to the fact that the area of the survey was restricted geographically and the other is the total number of interviews conducted. For example the mining industries (coal, petroleum and metallic) have not been included. At the best the survey may be considered simply as a pilot one. If the results of this survey are sufficiently illuminating to those concerned with curriculum planning and evaluation, an improved industrial technician survey should be organised on a largerscale.

Many of the new industries visited have recruited their foremen from the ranks of craftsmen and sometimes from the ranks of operatives. If the trend continues, then a special study of the educational requirements of these men in their new positions may be beneficial.



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## APPENDIX A



## APPENDIX B

C O P Y

TELEPHONES : PRINCIPAL 22596  
ENQUIRIES 21771-2



MINISTRY OF

EDUCATION

**TECHNICAL COLLEGE**

**PRIVATE MAIL BAG No. 5063**

**IBADAN · WESTERN NIGERIA**

*Your Ref. No.....*

*All communications to be addressed  
to the Principal quoting*

*Our Ref. No.....*

*Date.....*

Dear Sir:

INDUSTRIAL TECHNICIAN SURVEY

We are undertaking a survey of technicians in Nigeria. This survey is designed to enable us to help you by determining more objectively, the training needs of technicians. We can contribute to the development of industry and the country in general if as a result of this survey technicians are better qualified for their positions. This can be done by using the results of this survey to maintain adequate technical curriculum.

This survey is interested in technician occupations irrespective of the nationality of the present holder.

Attached please find two sheets of the Preliminary Information Form. Please complete and return the Form in the envelope provided so that we may be able to proceed to the second part of the survey which is scheduled to start early in September.

Your cooperation in this survey is indispensable and will be appreciated by us.

Yours faithfully,

---

Chairman, Advisory Board to  
The Technical College, Ibadan.

---

Principal  
The Technical College, Ibadan

INDUSTRIAL TECHNICIAN SURVEY  
PRELIMINARY INFORMATION FORM

Please complete and return to:

Industrial Technician Survey  
The Technical College  
P. M. B. 5063  
Agodi, Ibadan

- A. Nature of business or industry: \_\_\_\_\_
- B. Number of technicians presently employed in your business or department (please check) : 1 to 5 \_\_\_\_\_; 6 to 10 \_\_\_\_\_;  
11 to 20 \_\_\_\_\_; over 20 \_\_\_\_\_.
- C. Approximate number of technicians anticipated to be employed in five years: \_\_\_\_\_
- D. Total number of employees in all engineering, technical and craftsman categories (please check): 1 to 20 \_\_\_\_\_; 21 to 50 \_\_\_\_\_;  
51 to 100 \_\_\_\_\_; over 100 \_\_\_\_\_.
- E. Please fill out the table on the second page for each type of technician that you employ. Suggest names of supervisors or others who can give information about the work activities for each type of technician. Comprehensive information will later be sought from these prospective respondents by means of an interview and/or questionnaire.
- F. If you would like to receive a summary of the findings of the survey please complete the section below.

Name: \_\_\_\_\_

Formal Position: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Official Title	TECHNICIAN Equivalent Titles	Number Employed	Starting Salary p.a.	PROSPECTIVE RESPONDENT Name and Official Address	+Position
					(a) ____ (b) ____ (c) ____
					(a) ____ (b) ____ (c) ____
					(a) ____ (b) ____ (c) ____
					(a) ____ (b) ____ (c) ____
					(a) ____ (b) ____ (c) ____
					(a) ____ (b) ____ (c) ____

+ (a) Supervises technicians' work; (b) trains him for work; (c) other, (please specify).

## APPENDIX C



THE TECHNICAL COLLEGE  
P.M.B. 5063  
AGODI, IRADAN

INDUSTRIAL TECHNICIAN SURVEY FORM  
(Personal Interview Type)

Interviewer: _____	Interviewee's : _____
Date of Interview: _____	Name: _____
Time Taken in the Interview: _____	Address: _____
Start: _____	_____
Stop: _____	Official Position: _____
Period: _____	Technician Type: _____

Please record the reactions of the person interviewed to each of the following questions in your most legible style. Use the symbol (?) for "don't know" responses. Record the information for only one kind of technician on this form. Your participation is fully appreciated.

MARK THE TIME BLOCK (START) !

INDUSTRIAL TECHNICIAN SURVEY  
SURVEY FORM

Please complete and return to:

Industrial Technician Survey  
The Technical College  
P. M. B. 5063  
Agodi, Ibadan

I. GENERAL INFORMATION (Locating and Identifying the Technician)

A. Qualifications of the respondent to give information about  
this technician (please check):

supervises his work \_\_\_\_\_; trains him for work \_\_\_\_\_;  
other \_\_\_\_\_.

B. Nature of business or industry: \_\_\_\_\_

C. Official occupational title for this type of technician:

\_\_\_\_\_

D. Other occupational titles which may be used:

(1) \_\_\_\_\_

(2) \_\_\_\_\_

E. Firm's or department's job description of this technician:

job is not described \_\_\_\_\_; no copy available \_\_\_\_\_;  
copy attached \_\_\_\_\_; other \_\_\_\_\_;

F. Number of these technicians the respondent works with \_\_\_\_\_

G. In which of the following department(s) does this technician  
primarily work (please check):

design and development \_\_\_\_\_; construction supervision \_\_\_\_\_;  
production planning \_\_\_\_\_; technical sales & service \_\_\_\_\_;  
production supervision \_\_\_\_\_; installation & maintenance \_\_\_\_\_;  
construction planning \_\_\_\_\_; other: \_\_\_\_\_.

## II. JOB DESCRIPTION AND WORK ACTIVITIES.

Directions: For each of the following activities (and any you may add) please circle: (i) the letter you judge represents the frequency with the activity is performed,

F - Frequently, many times a day or for most of the working day;

O - Often, as much as four or five times a day on the average

S - Sometimes, as much as four or five times a week on the average

R - Rarely, not more than once a week on the average

N - Never

and (ii) the number of months which you judge represents the period after which a new technician (at his first employment) will be expected to assume each activity.

6 - Over six months.

3 - Three months

1 - One month

$\frac{1}{2}$  - Two weeks

0 - Immediately

In addition, for each activity please indicate in the spaces provided, the details of the equipment or article, major components, instruments, tools, and expendable materials used in performing the activity.

## MAJOR FUNCTIONAL CATEGORIES

1. Diagnoses and Solves Unusual Malfunction and Repair Problems - Troubleshoots
2. Performs Preventive Maintenance
3. Removes Entire Assemblies or Equipment Components for Replacements or Repair
4. Performs Major Overhaul of Equipment
5. Makes Prescribed Modifications in Equipment
6. Makes Original Installation or Replacement of Equipment
7. Calibrates, Adjusts, and Aligns Equipment
8. Maintains and Repairs Test Equipment, Tools, Machinery Used
9. Inspects Equipment
10. Inspects Materials, Products
11. Produces Engineering Drawings
12. Fabricates Test Equipment, Tools
13. Fabricates Saleable Products
14. Operates Equipment
15. Plans, Establishes, and Implements (through directives to others) Work Methods, Procedures, and Performance Standards
16. Designs Test Equipment, Tools
17. Designs Saleable Products
18. Inspects, Evaluates, and Reports on Supervised Maintenance or Construction or Production Activities
19. Organizes, Supervises, and Evaluates Personnel
20. Performs Administrative Duties
21. Performs Liason with Other Departments, Clients
22. Others: \_\_\_\_\_

## RATING SCALES

For each functional category, please indicate:

Frequency of Activity;

FREQUENTLY, many times a day or for most of the working day

●FTEN, as much as four or five times a day on the average

SOMETIMES, as much as four or five times a week on the average

RARELY, not more than once a week on the average

NEVER

Activity assumed after;

Over six months.

Three months

One month

Two weeks

0 - (Immediately)

## 1. Diagnoses and Solves Unusual Malfunction and Repair Problems -

F O S R N6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 2. Performs Preventive Maintenance

F O S R N6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 3. Removes Entire Assemblies or Equipment Components for Replacements or Repair

F O S R N6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 4. Performs Major Overhaul of Equipment

F O S R N

6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 5. Makes Prescribed Modifications in Equipment

F O S R N

6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 6. Makes Original Installation or Replacement of Equipment

F O S R N

6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 7. Calibrates, Adjusts, and Aligns Equipment

F O S R N

6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 8. Maintains and Repairs Test Equipment, Tools Machinery Used

F O S R N

6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 9. Inspects Equipment

F O S R N

6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials



## 10. Inspects Materials, Products

F O S R N6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 11. Produces Engineering Drawings (freehand sketches, finished working drawings)

F O S R N6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 12. Fabricates Test Equipment, Tools

F O S R N6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 13. Fabricates Saleable Products

F O S R N

6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 14. Operates Equipment

F O S R N

6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

15. Plans, Establishes, and Implements (through directives to others)  
Work Methods, Procedures, and Performance Standards

F O S R N

6 3 1  $\frac{1}{2}$  0

Please indicate to which functional category numbers or other  
unspecified category this applies:

Functional Category Nos. : \_\_\_\_\_

Others (please specify): \_\_\_\_\_

## 16. Designs Test Equipment, Tools

F O S R N6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 17. Designs Saleable Products

F O S R N6 3 1  $\frac{1}{2}$  0

Equipment, Products, Projects, etc.	Components	Instruments	Tools	Expendable Materials

## 18. Inspects, Evaluates and Reports on Supervised Maintenance &amp; other Activities to ensure:

- A. Adherence to approved work methods and procedures
- B. Adherence to established standards of performance
- C. Adherence to priorities assigned
- D. Adequacy of preventive maintenance and minor repair done on equipment and tools used
- E. Appropriate utilization of manpower, test equipment, supplies, and space resources
- F. Others \_\_\_\_\_

18. (contd.)

F O S R N6 3 1  $\frac{1}{2}$  0

19. Organizes, Supervises, and Evaluates Personnel:

- A. Develops organizational structure, plans work flow, and a personnel to sections and teams
- B. Orients newly assigned personnel
- C. Assigns work to subordinates
- D. Assists subordinates in interpreting and applying technical information and directives
- E. Evaluates and maintains records of the performance of individuals and teams
- F. Others \_\_\_\_\_

F O S R N6 3 1  $\frac{1}{2}$  0

Designation(s) of subordinate personnel \_\_\_\_\_

Approximate number of subordinate personnel \_\_\_\_\_

20. Performs Administrative Duties

- A. Maintains files
- B. Determines requirements for tools, machinery, equipment, supplies, workspace
- C. Insures availability of tools, machinery, equipment, supplies, workspace
- D. Schedules unit work leads and establishes work priorities
- E. Others \_\_\_\_\_

F O S R N6 3 1  $\frac{1}{2}$  0

21. Performs Liason with other Departments, Clients (as representative or salesman)
- A. Models equipment, products, plans
  - B. Corresponds with clients, other departments
  - C. Represents department in meetings or conferences with suppliers, clients, other departments
  - D. Others \_\_\_\_\_

<u>F</u>	<u>O</u>	<u>S</u>	<u>R</u>	<u>N</u>
<u>6</u>	<u>3</u>	<u>1</u>	<u><math>\frac{1}{2}</math></u>	<u>0</u>

22. Any other Activity: \_\_\_\_\_

<u>F</u>	<u>O</u>	<u>S</u>	<u>R</u>	<u>N</u>
<u>6</u>	<u>3</u>	<u>1</u>	<u><math>\frac{1}{2}</math></u>	<u>0</u>

Any other Activity: \_\_\_\_\_

<u>F</u>	<u>O</u>	<u>S</u>	<u>R</u>	<u>N</u>
<u>6</u>	<u>3</u>	<u>1</u>	<u><math>\frac{1}{2}</math></u>	<u>0</u>

### III. SUPERVISION RECEIVED

- A. Initially receives general assignment of duties, and subsequently special work assignment
- Or B. Receives work assignments at regular periods (please check one)
  - (1) At the completion of previous work assignment \_\_\_\_\_
  - (2) Daily \_\_\_\_\_ (3) Weekly \_\_\_\_\_ (4) Other \_\_\_\_\_

## IV. MISCELLANEOUS INFORMATION

- A. Is there an organized 'training within industry' for this type of technician in this plant? Yes \_\_\_\_; No \_\_\_\_.
- B. If training is provided what is its nature (please check):  
 Supervised on-the-job training \_\_\_\_; Formal classes \_\_\_\_;  
 Short courses \_\_\_\_; Correspondence courses \_\_\_\_; Other \_\_\_\_.
- C. Are there any evening courses technical personnel might benefit from? Yes \_\_\_\_; No \_\_\_\_.
- D. If yes, details \_\_\_\_\_

STOP

END OF INTERVIEW

MARK TIME BLOCK (STOP)

V. Interviewer's Frank, General Appraisal of the Interview

Please check the following as appropriate to indicate (1) the general reactions of the person interviewed, (2) your reactions to and suggestions for the improvement of this form, and (3) your remarks.

## A. Interviewee's Reactions (please check):

Cooperative ____	Interested ____	Helpful ____
Antagonistic ____	Disinterested ____	Time wasted ____
Inexperienced ____	Irritable ____	Other ____

## B. Your Reactions to the Form (please check):

The form is; too long \_\_\_\_? too short, \_\_\_\_; about right \_\_\_\_.

## C. Particular weakness(es) seem present in the following:

Section: \_\_\_\_; \_\_\_\_; \_\_\_\_; \_\_\_\_; \_\_\_\_.

Item: \_\_\_\_; \_\_\_\_; \_\_\_\_; \_\_\_\_; \_\_\_\_.

## D. Your further remarks:

APPENDIX D

THE TECHNICAL COLLEGE  
P. M. B. 5063  
AGODI, IBADAN

INDUSTRIAL TECHNICIAN SURVEY  
GUIDE TO INTERVIEWS

- A. Provide a good climate for the interview; no disturbing factors; personal (single individual) interview, accept no group situations; make public no variances in replies, reactions, comparisons, attitudes, etc.
- B. Keep a careful record of time consumed in each interview. It is hoped that each interview will take less than one hour.
- C. Be prepared to describe the role and job of the technician. The term "technician" may be vague to many in industry. The following definition might help. "A technician holds a technical job intermediate between the craftsman or tradesman and the professional engineers and scientists. Generally, a prerequisite of special training subsequent to secondary school education is necessary for all technicians."
- D. Please make a determined effort to secure the firm's job description or personnel specification for the technician type.
- E. Do not consider on any one form any more than one kind of technician.
- F. Ultimate reliability of the data will depend upon complete clarification of the interviewee's qualifications to give authentic information. Please complete the item IA.
- G. To facilitate the interview, provide copies of pages 2a and 2b for your respondent during the interview. Please remember to reclaim them at the end of the interview.
- H. In completing some sections of II and III, "pump priming" (but not direct suggestions) may be needed and productive where additional details are needed. You are the judge to determine when possibilities are exhausted and to budget your time.
- I. Use the symbol (?) for "don't know" responses.
- J. Use whatever subterfuge of strategy is necessary to withdraw yourself immediately after each interview and come to grips with section V. Your frank ideas and suggestions here will be useful in the conduct of further interviews.

Let's look forward to an interesting experience!



## APPENDIX E

### A List Showing The Nature Of Products, Service, Or Business Of Companies and Government Establishments To Whom The Preliminary Information Forms Were Sent

#### Manufacturing Industries

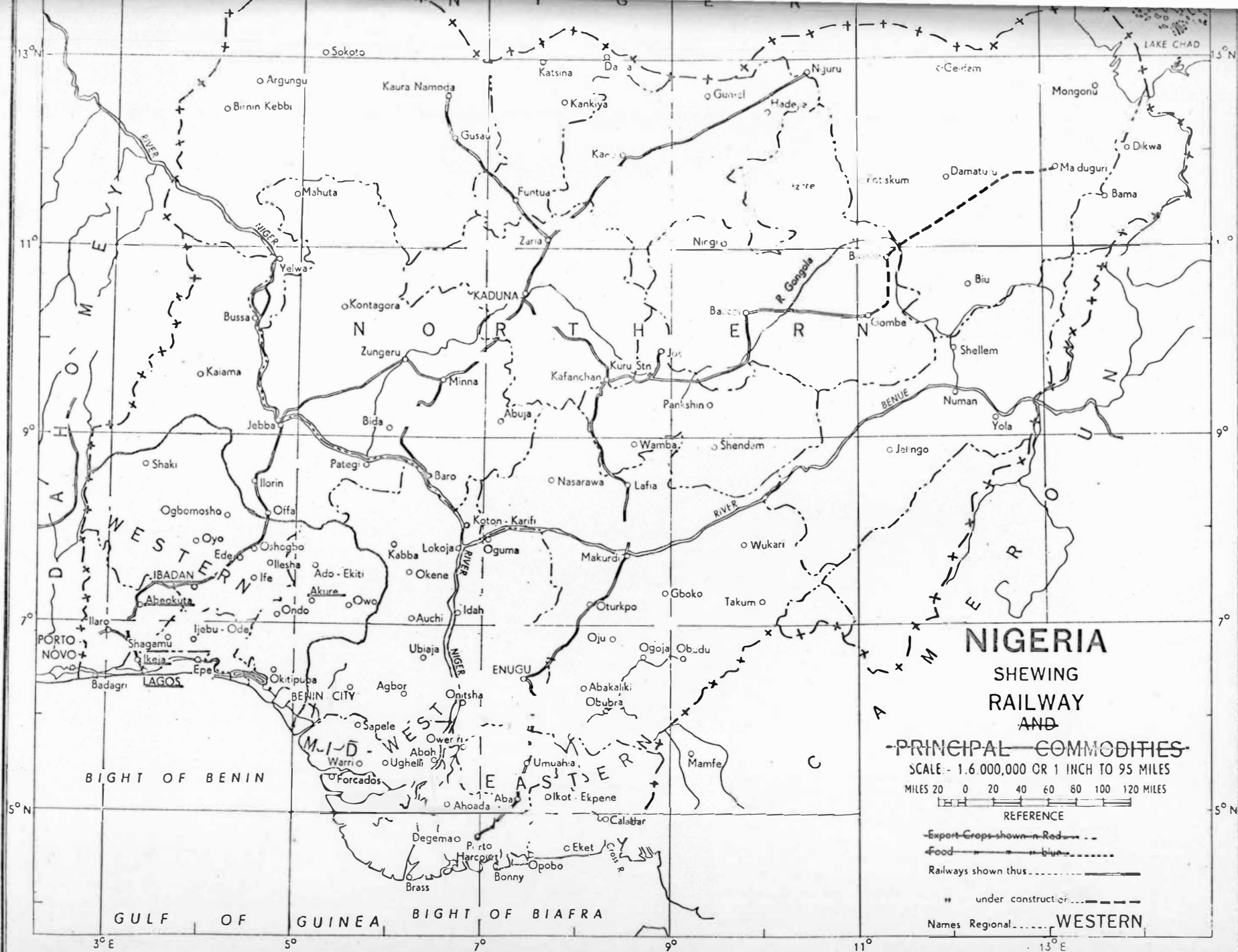
Dairy products; Fruits and vegetables - canned and preserved;  
Fish; Grain mill products; Bakery products; Cocoa, chocolate and sugar  
confectionery; Miscellaneous food preparations; Beer; Soft drinks and  
carbonated water; Thread, yarn and woven textiles; Knitted textiles;  
Cordage, rope and twine; Footwear; Wearing apparel except footwear;  
Made-up textile goods except wearing apparel; Sawn timber; Furniture  
and joinery; Articles of pulp, paper and paper board; Printed products;  
Rubber and rubber products except footwear, Basic industrial chemicals;  
Paints, varnishes and lacquers; Miscellaneous chemical products;  
Miscellaneous products of petroleum and coal; Tiles, bricks and other  
structural clay products; Glass products; Pottery, china and earthenware;  
Cement; Miscellaneous non-metallic mineral products; Metal products  
except machinery and transport equipment and furniture; Electrical  
machinery, apparatus and appliances; Boats; Railroad equipment; Motor  
vehicles; Motorcycles and bicycles; Plastic products.

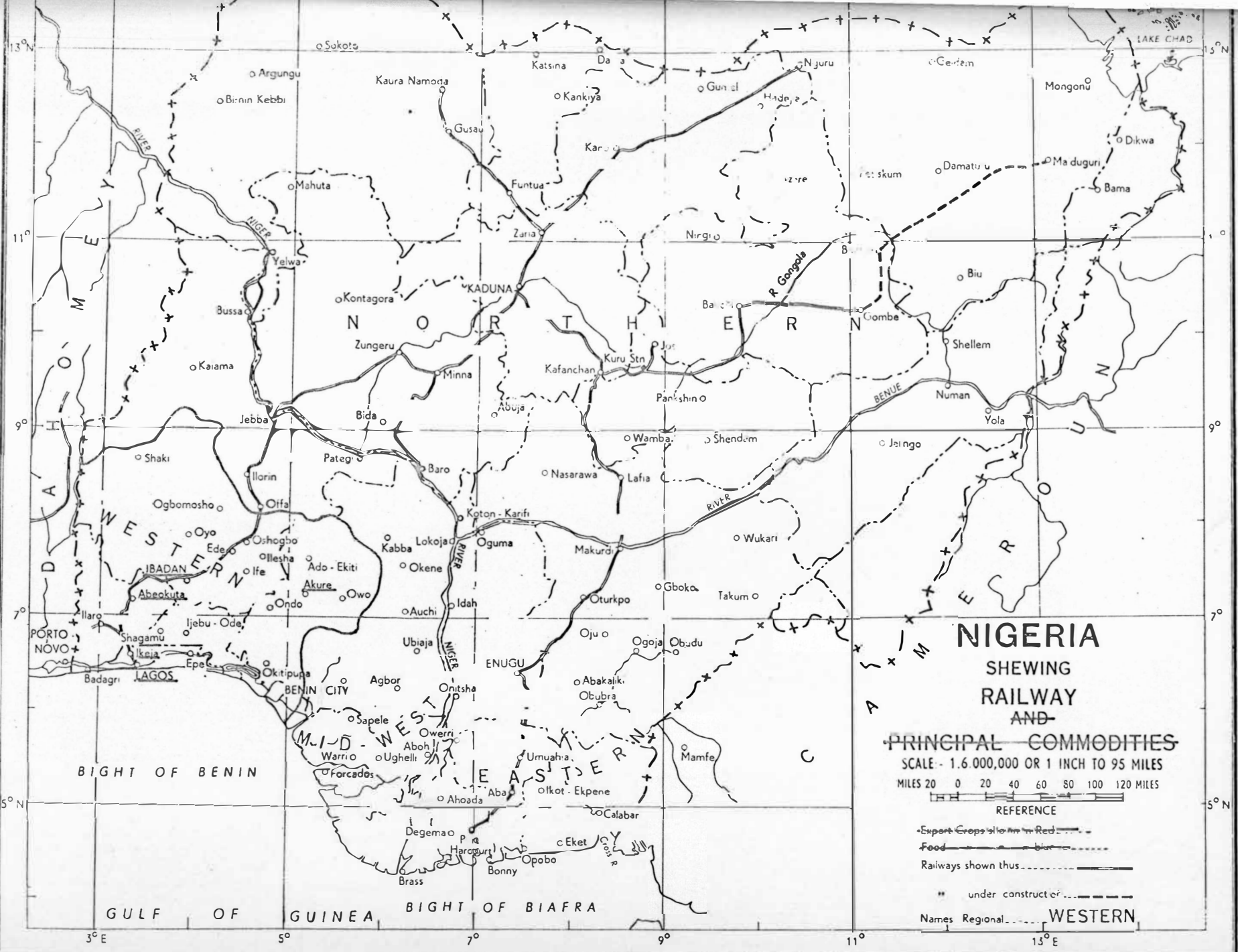
## Service Industries

Radio and television broadcasting; wired radio distribution; Municipal water supply; Civil engineering consulting; Port facilities; Inland waterways; Airline operating; Motor vehicle sales and service; Building and civil engineering contracting; Mechanical contracting; Drug dispensing (chemists); Water prospecting; Railway operating; Land surveying; Steamer line operating; Electrical and radio appliances - sales and service; Timber preservation; Architectural planning; Electronic communication; Electricity supply.

## Government ministries and departments

Ministries of Communications, Information, Trade and Industry, Lands and Housing, Works and Transport, Agriculture and Natural resources, and Home Affairs. Departments of Inland waterways, of Forest research, and of Agricultural research.





# NIGERIA

SHOWING  
RAILWAY  
AND

## PRINCIPAL COMMODITIES

SCALE - 1:6,000,000 OR 1 INCH TO 95 MILES

MILES 20 0 20 40 60 80 100 120 MILES



REFERENCE

Export Crops shown in Red

Food shown in Blue

Railways shown thus

\* under construction

Names Regional WESTERN

