

**YEAR BOOK**  
**OF**  
**CARIBBEAN**  
**RESEARCH**  
1949 SUPPLEMENT

**Natural Sciences**

Survey of Research and Investigation in  
the Caribbean and Adjoining Countries

Compiled by  
RESEARCH BRANCH, CENTRAL SECRETARIAT  
CARIBBEAN COMMISSION  
KENT HOUSE  
PORT-OF-SPAIN, TRINIDAD  
1950

**YEAR BOOK**  
**OF**  
**CARIBBEAN**  
**RESEARCH**  
**1949 SUPPLEMENT**

**Natural Sciences**

Survey of Research and Investigation in  
the Caribbean and Adjoining Countries

Compiled by  
RESEARCH BRANCH, CENTRAL SECRETARIAT  
CARIBBEAN COMMISSION  
KENT HOUSE  
PORT-OF-SPAIN, TRINIDAD  
1950

TECHNICAL PUBLICATIONS OF THE  
ANGLO-AMERICAN CARIBBEAN COMMISSION  
AND THE CARIBBEAN COMMISSION\*

	Each Price
(a) FISHERY SERIES	
The Crawfish Industry of the Bahamas (Mimeographed Pamphlet)	\$ .10
Fresh and Brackish Water Fish Culture ( do. )	.10
An Experimental Fishery Survey in Trinidad, Tobago and British Guiana	.25
Guide to Commercial Shark Fishing in the Caribbean Area	1.00
The Spiny Lobster of the Caribbean and Florida	.50
(b) CROP INQUIRY SERIES	
Livestock in the Caribbean (Crop Inquiry Series No. 1)**	.50
Grasses and Grassland Management in the Caribbean (Crop Inquiry Series No. 2)**	.50
Grain Crops in the Caribbean (Crop Inquiry Series No. 3)	.50
Root Crops and Legumes in the Caribbean (Crop Inquiry Series No. 4)	.50
Vegetables in the Caribbean (Crop Inquiry Series No. 5)	.50
The Sugar Industry of the Caribbean (Crop Inquiry Series No.6)	1.00
(c) TRADE BULLETINS	
The Sugar Trade of the Caribbean (External Trade Bulletin No.1)	1.00
The Cement Trade of the Caribbean ( " " " No. 2)	1.00
The Fish Trade of the Caribbean ( " " " No. 3)	1.00
The Tobacco Trade of the Caribbean( " " " No. 4)	1.00
The Dairy Products Trade of the Caribbean (External Trade Bulletin No. 5.)	1.00
The Meat Trade of the Caribbean (External Trade Bulletin No.6)	1.00
The Vegetables Trade of the Caribbean (External Trade Bulletin No. 7)	1.00
The Grain Trade of the Caribbean (External Trade Bulletin No.8)	1.00
(d) MISCELLANEOUS	
Caribbean Medical Centre	.50
Caribbean Tourist Trade	.50
Forest Research within the Caribbean Area	.50
Caribbean Land Tenure Symposium	1.50
Industrial Development of Puerto Rico and the Virgin Islands of the United States--Report of the United States Section, Caribbean Commission	1.50
Industrial Development in the Caribbean - W. Arthur Lewis	.20
Caribbean Economic Review	.50
Population Movements in the Caribbean - Malcolm J. Proudfoot	1.00
Year Book of Caribbean Research, 1948	2.00
* Obtainable from Caribbean Commission, Kent House, Port of Spain, Trinidad; and Columbia University Press, New York City, N.Y.	
** Out of print.	

The Anglo-American Caribbean Commission was created by the Governments of the United States and the United Kingdom on March 9, 1942, for the purpose of encouraging and strengthening social and economic cooperation between the United States of America and its possessions and bases in the area known geographically and politically as the Caribbean, and the United Kingdom and the British Colonies in the same area, and to avoid duplication of research in these fields. On December 20, 1945, the following joint communiqué was issued: "The Governments of France and of the Netherlands have accepted an invitation extended to them by the Governments of the United Kingdom and United States of America to join the Anglo-American Caribbean Commission. The name of the Commission will be changed appropriately..." The Commission is now known as the Caribbean Commission.

The Caribbean Research Council was established by the Commission in August, 1943, to survey needs, to determine what research has been done, to facilitate research on a cooperative basis, and to arrange for the prompt dissemination of the results of research, all without limitation to the field of inquiry.

In pursuance of these objectives, a number of Research Committees has been appointed for various fields of research.

The Central Secretariat of the Commission is located at Kent House, Port of Spain, Trinidad. The work of the Secretariat is divided into two main branches: administrative and research. The Research Branch, which includes a Statistical Unit, works in close cooperation with the Caribbean Research Council and its various Research Committees.

## INTRODUCTION

The first edition of the Year Book of Caribbean Research, containing a record of research and investigations being undertaken in the "Commission territories" of the Caribbean in 1948, was published by the Research Branch of the Central Secretariat of the Caribbean Commission in May, 1949. The Year Book was divided into four parts, covering respectively the fields of (1) Agriculture, Forestry, Fish and Wildlife; (2) Medicine, Public Health, Sanitary Engineering, Nutrition; (3) Sociology, Statistics, Economics, Education, Planning and Housing; (4) Building, Chemical Technology, Engineering, Geodesy and Surveying, Geology. It recorded details of a total of 789 projects. This was the first attempt to give a systematic account of the research and investigations being conducted in the area, and it was well received by research workers and directors throughout the Caribbean. Numerous requests have also been received for copies from institutions and individuals outside the area.

It has been decided, in view of the favourable response, to publish a revised edition of the Year Book periodically and to maintain its records up-to-date in the interim by the publication of a series of annual supplements. For the sake of convenience, future editions of the Year Book and the annual supplements will be published by sections. It has also been decided, in view of the increasing attention to research in the Natural Sciences in the Caribbean, to add a fifth part, Natural Sciences, to the Year Book. The present bulletin is the first annual supplement dealing with research in the fields of Anthropology, Biology, Botany, Geology, Physics and Zoology during 1949.

The general plan of this supplement follows that adopted for the Year Book. The Universal Decimal System of classification has been used, and projects are numbered seriatim. For ease of reference, projects continuing from 1948 are identified by a second number in parenthesis. This latter is the number of the project in the 1948 Year Book, which, as mentioned above, will be the basic text of reference until superseded by a new edition. No additional information was obtained in respect of a number of continuing projects; these are shown separately, under their 1948 Year Book number in parenthesis, in an Appendix for record purposes.

A select bibliography of Caribbean Research or research of interest to Caribbean territories published in 1948-49 has been added, following the recommendation of the Research Council at its Second Meeting held at Kent House, May 27-30, 1949. Research personnel and institutions are listed in a separate section, also in accordance with the recommendations of the Research Council.

The Secretariat is greatly indebted to all research workers and institutions who contributed details of their work and wishes to record its appreciation of their cooperation, without which the compilation of this supplement would not have been possible.

C.K. Robinson  
Editor

## LIST OF ABBREVIATIONS

BD	Botany Department
BGM	British Guiana Museum
DA	Department of Anatomy
D. Arch.	Department of Archeology
DG	Department of Geology
GMS	Geological Mining Service
GSD	Geological Survey Department
ICTA	Imperial College of Tropical Agriculture
IJ	Institute of Jamaica
NWNA	Natuurwetenschappelijke Werkgroep Nederlandse Antillen (National Science Study Group in the Netherlands Antilles)
PD	Physics Department
PU	Princeton University
SM	Science Museum
SSRC	Social Science Research Center
UCWI	University College of the West Indies
UPR	University of Puerto Rico
YU	Yale University
ZD	Zoology Department

## TABLE OF CONTENTS

Introduction	v
List of Abbreviations	vii

### PART I Research Projects

CHAPTER I	Anthropology	3
CHAPTER II	Biology	5
CHAPTER III	Botany	7
CHAPTER IV	Geology	9
CHAPTER V	Physics	11
CHAPTER VI	Zoology	13
APPENDIX	Projects listed in the 1948 Year Book for which no new information is available	
	Geology	19
	Zoology	19
INDEX		23

### PART II Research Institutions and Personnel

British Guiana	27
Jamaica	27
Netherlands West Indies	29
Puerto Rico	29
Caribbean Commission	30

### PART III A Select Bibliography

Biology	35
Botany	35
Geology	36
Meteorology	36
Physics	37
Zoology	37

**PART I**  
**Research Projects**  
**on**  
**NATURAL SCIENCES**



## CHAPTER I

### ANTHROPOLOGY

JAMAICA, SM,IJ, Kingston and D. Arch., YU, Connecticut. Study of the aborigines of Jamaica. Lewis, C.B.; Howard, R.

[ 1 ( 652 ) ]

(1) To make collections of aboriginal material; (2) to determine, if possible, the stratigraphical sequence; (3) to ascertain whether there was any pre-Arawak occupation; (4) to collate and bring up to date known material on the aborigines of Jamaica.

The study continued in 1949, but so far no publication has been issued. \*

Project started: 1947.

JAMAICA, DA, UCWI, Mona. A study of the skeletal remains of the aboriginal inhabitants of Jamaica. Harper, W.F.; Lewis, C.B.

[ 2 ]

The elucidation of Arawak affinities.

Anthropometric measurements of Arawak skulls and other skeletal parts are being made. A preliminary report on the findings is being prepared as a communication to be read at the International Congress Meeting of Anatomists and Anthropologists (Oxford, July, 1950). Mr. C. Bernard Lewis, Curator of the Science Museum, Institute of Jamaica, Kingston, who has provided access to the Arawak remains, will collaborate in the preliminary report.

Project started: 1949.

PUERTO RICO, SSRC, UPR, Río Piedras. Human biology study. Shapiro, Harry L.; et al.

[ 3 ( 665 ) ]

To study the biological status of the people of Puerto Rico, with a view to determining the relationship between the human biology of the island and the environmental and cultural influences that bear on it.

This project was conducted, with the active cooperation of the insular Department of Health and the School of Tropical Medicine, by a team of three anthropologists under the direction of Dr. Shapiro, Chairman of the Department of Anthropology and Curator of Physical Anthropology at the American Museum of Natural History and Professor of Anthropology at Columbia University, who measured and examined 3,400 adults from all parts of the island, in a study designed to relate the physiological and biological development of the people of Puerto Rico to their

\* Background information will be found in Year Book of Caribbean Research, 1948, p. 244.

nutritional, ecological and genetic background. Thirty-eight measurements and observations were made. These included observations of general dental morphology and observations yielding physiological-pathological data. Blood samples were taken for typing, hemoglobin counts and serology. Fecal samples were examined for all the important helminths and protozoa. Blood pressures, temperature and pulse were taken. The data were coded on IBM cards and are being analysed at the American Museum of Natural History, New York. As a subsidiary to this project, 2,500 children drawn from the school population of the San Juan metropolitan area were measured and examined in the School Hygiene Clinic in San Juan. This study was carried out with the assistance of the insular Departments of Education and Health. It will attempt to relate the physical development of children to nutritional and socio-economic influences, and will define the relationship, for each child, between his skeletal and his chronological age. In addition to anthropometric measurements, X-rays were taken of the bone structure of each child, and blood was drawn for serological tests from a sub-sample. The examination of the full sample was complete by the end of May, 1949. As a result of this project, clinical and public health standards of Puerto Ricans will be established. Environmental factors have been evaluated to determine their relationship to group differences. These factors were based on climatic, geographical, nutritional, social and urban-rural differences; and the medical condition of each subject, as determined by the examination and laboratory tests, was used in evaluating them.

Project started: Spring of 1948.

Project completed: Fall of 1949.

## CHAPTER II

### BIOLOGY

BRITISH GUIANA, BGM, Georgetown. British Guiana Museum. Roth, Vincent; Singh, Ram S.

[ 4 ( 722 ) ]

Collection and dissemination of knowledge on local and general natural history, anthropology, natural resources, economic science, art and history.

The Natural History Section, is gradually being re-assembled in the disused Cumingsburg Market and an aquarium, vivarium and aviary, which attract an average of 34,000 visitors per month, have been added. Plans are under way whereby the whole museum will be re-amalgamated (with government assistance and ultimate control) with the Royal Agricultural and Commercial Society of British Guiana from which it originated.

In 1949, the Museum sponsored and prepared a new, all-embracing, wildlife conservation and protection ordinance. \*

Project started: About 1850.

CURACAO, NWNA, Willemstad. General study of the fauna and flora of the Netherlands West Indian islands. Hummelinck, P. Wagenaar.

[ 5 ]

To study and investigate the fauna and flora of the area.

Marine-biological investigations are included, among other things, in the programme of work.

Project started: 1948.

JAMAICA, Private Research (SMIJ, Kingston). Study of the flora and fauna of small Caribbean islands: Pedro and Morant Cays and the Cayman Islands. Lewis, C.B.

[ 6 ( 452 ) ]

(1) To discover the origins and development of floras and faunas of small Caribbean islands; (2) to examine the processes of speciation which are frequently associated with isolated populations.

Pedro and Morant Cays were again briefly visited during June, 1949, and additional specimens and data obtained. A brief historical background was published. The project is continued whenever circumstances permit the investigator to work on it.

Project started: 1938.

\* Background information will be found in Year Book of Caribbean Research, 1948, p. 273

## CHAPTER III

### BOTANY

JAMAICA, BD, UCWI, Mona. Factors affecting the growth of roots.  
Asprey, G.F. [ 7 ]

To elucidate the physiological requirements of roots from the shoot in normal plants and those growing under water-logged conditions.

Preliminary work in the development of techniques for growing rice in solution culture and root tissue culture is proceeding.

Project started: 1949.

JAMAICA, SM, IJ, Kingston. A study of the fern flora of Jamaica.  
Proctor, G.R. [ 8 ]

A comprehensive study of the fern flora of Jamaica, including the correlation of the work of earlier students, particularly that of the late Dr. William R. Maxon of the U.S. National Herbarium.

The preliminary research involves intensive collecting in certain poorly-known areas; and the accumulation, both by field observations and herbarium studies, of exact data regarding the distribution, ecology and variation of each species. It is intended that the ultimate result will be the publication of the volume on ferns for the Flora of Jamaica, a series commenced by the Natural History Department of the British Museum.

Project started: 1949.

TRINIDAD, ICTA, St. Augustine. The Flora of Trinidad and Tobago.  
Baker, R.E.D.; Simmonds, N.W.; et al. [ 9 ]

To complete the Flora of Trinidad and Tobago.

The first part of the Flora, by R.O. Williams, was published in 1928, and further parts, mainly by R.O. Williams and E.E. Cheesman, have appeared at intervals. It will eventually be in three volumes, of which Vol. I and parts of Vol. II are complete.

Project started: 1928.

## CHAPTER IV

### GEOLOGY

BRITISH GUIANA, GSD, Georgetown. Geological survey of British Guiana.  
Bracewell, S.; et al.

[ 10 ( 779 ) ]

The completion of a geological map of British Guiana, and the investigation of the mineral resources of the Colony.

The results of previous work have been published in a series of Reports and Bulletins (Nos. 1-21) and geological maps. \*

Project started: 1933.

UNITED STATES OF AMERICA, DG, PU, New Jersey. Geophysical and geological investigations of various oceanic areas, in particular the Caribbean region. Hess, H.H.; Maxwell, J.C.; et al.

[ 11 ]

To attempt a correlation between available geophysical data and the geology in critical areas, in the hope of thereby attaining a better understanding of the mechanics of deformation of the earth's crust and of the relationship of earthquakes and igneous activity to crustal deformation.

Papers have been published by Hess on the geological interpretation of geophysical surveys in the West Indies, and on the geology of Tobago and Margarita by Maxwell and Hess. A paper by G. Dengo, Research Associate, on the geology of the Caracas area, Venezuela, is ready for publication. Graduate students of Princeton are also associated in this project. In this connection, R.A. Christman is now working up the results of a study of the geology of St. Martin, St. Bartholomew and Antigua; and R.J. Smith and J.C. MacLachlan are continuing a programme of geologic exploration in the area between Los Teques and Villa de Cura, Venezuela. Reconnaissance surveys have been carried out in the Coast Range east of Caracas, and near Carupano, Venezuela, and on the islands of Bonaire and Curacao. A grant from the U.S. Office of Naval Research has helped defray the expenses of this programme. The work in Venezuela has been financed largely by the Ministerio de Fomento of the Venezuelan government.

Project started: 1932.

Duration: To end of 1952.

\* Background information will be found in Year Book of Caribbean Research, 1948, p. 301.

## CHAPTER V

### PHYSICS

JAMAICA, PD, UCWI, Mona. Electronic energy level investigations.

Bowen, F.H.

[ 12 ]

To study (1) sources of the excitation of electronic energy levels of high quantum number; (2) electronic energy levels of high quantum numbers; (3) intensities in the emission spectra of some of the elements.

Apparatus suitable for the development of the higher series members of low melting point elements has been developed. The known series members of some of the alkali metals has been extended. A comparative study has been made of sharp and diffuse lines of the sodium spectrum.

Project started: 1945.

JAMAICA, PD, UCWI, Mona. The divergence difficulty of quantum electrody-  
namics. Cade, R.

[ 13 ]

To contribute to the finding of a consistent quantum electrodynamics which gives finite predictions for all degrees of approximation.

It has been found, assuming a theory of canonical field variables in charge-free electrodynamics analogous to Snyder's theory of quantized space-time, that there is a "cut-off" frequency, which, if the assumption is valid and the theory extended, might remove the divergence difficulty.

Project started: January, 1948.

JAMAICA, PD, UCWI, Mona. The ellipsoid method for the determination of  
anisotropic dielectric constants. Cade, R.

[ 14 ]

To calculate the electrostatic forces on a conducting, anisotropic, dielectric ellipsoid suspended in a conducting fluid and influenced by a uniform electric field of force.

Project started: Nov. 1949.

Duration to summer 1951.

JAMAICA, PD, UCWI, Mona. Development of a microwave technique for the  
measurement of electron concentration and collision frequency in  
ionised gases. Sprinks, M.

[ 15 ]

Measurement of these quantities with a 10 cm. system to order of accuracy of 5% and the investigation of (i) variation within the D.C. glow discharge in gases, (ii) values in transient effects, such as explosion flames and gaseous reaction.

At the University College of Hull, England, work was carried out at a frequency of 1200 mc/s, and measurements secured on glow discharge giving the variation of the measured quantities with varying conditions of pressure, and also at each pressure the variations over the various components of discharge, e.g. Negative glow, Faraday Dark Space and Positive column. Accuracies of 5% may be claimed in the ranges of values  $N = 10^8$  to  $10^{11}$  electrons/cc and orders of magnitude down to  $10^6$  and up to  $10^{13}$ . Construction work has started at the University College of the West Indies on a frequency modulated 10 cm. system.

Project started: 1947.

Duration: to 1953.

## CHAPTER VI

### ZOOLOGY

JAMAICA, ZD, UCWI, Mona. A survey of the histology of the eyes of Jamaican reptiles. Underwood, G.L.

[ 16 ]

A full survey to throw further light on the correlation between habits and retinal structure of Jamaica reptiles.

The project is being undertaken as a result of the interesting observations made in what was intended as a preliminary survey conducted for the selection of certain species for experimental study of visual capacities.

The Jamaican geckos, Gonatodes fuscus and Sphaerodactylus spp., have eyes of outstanding interest. They show a number of features not previously recorded, and provide conclusive evidence of the correctness of Wall's hypothesis that cones may be transmuted into rods. Also, a new type of double cone has been discovered, unique in the vertebrate series. The eye of Anolis shows an interesting condition of the fovea, tending to confirm Pumphrey's interpretation of its functional significance. The condition of the eye of the burrowing snake, Typhlops jamaicensis, provides evidence confirming Wall's hypothesis that snakes are of burrowing origin.

Project started: 1949.

JAMAICA, ZD, UCWI, Mona. A study of features of interest of the soft-part anatomy of Amphisbaena (from Trinidad). Underwood, G.L.

[ 17 ]

To collect data to help in the assessment of the correct systematic position of the Amphisbaenidae, a curious little known group of burrowing reptiles.

A unique condition of the vascular system has been discovered, in addition to other interesting features, which should help in the assessment of the correct systematic position of the Amphisbaenidae. Zangerl's view (based on osteological study), that they are distinct from lizards, is, on the whole, confirmed.

Project started: 1949.

JAMAICA, ZD, UCWI, Mona. Reactions to light and shade and colour change in Diadema antillarum. Millott, N.

[ 18 ]

To ascertain nerve paths and receptors involved in the reactions, physiological characters of response and relation to colour change and production of pigment.



Sensitivity is more pronounced to light of short wave-length. No specific photo receptors have been discovered yet. Sensitivity varies inversely with degree of pigmentation. Conduction of impulses for response involves radial nerve cords. The animal is extremely sensitive to light changes, both inside and outside the shell. Spine jerks are orientated with respect to light source.

The circum-oral nerve ring is not essential for the spine jerk response, although section of the radial nerves and the removal of the circum-oral ring causes the loss in tone of the spines. The colour change is independent of the central nervous system. Local changes in colour can be brought about by local changes in illumination, but there is clear evidence, in young forms at least, of a diurnal-nocturnal colour change independent of the degree of illumination.

Evidence accumulated so far tends to show a general surface sensitivity to shading; the spine shafts, however, seem insensitive. Successive changes in illumination intensity bring about diminution in the strength of the response. The spine jerk response is sometimes given in response to an increase of lighting as well as shading. The response is not nearly so well marked nor so constant in its appearance as the response to shading, and it diminishes much more quickly when the experiments are repeated within a certain time limit.

There is a great range of variation among individuals in their sensitiveness to light change as shown by (a) spine movements, and (b) tropisms. Most young forms are negatively phototropic and seek the shade when they have been kept in diffuse daylight or darkness. They rapidly accommodate themselves to a certain level of illumination, and under certain conditions show a positive phototropism. The pathway of nerve impulses for the spine jerk reflex is still being investigated. It has now become possible to record the movement of the spines in the spine jerk, and it has been shown that nerve excitation spreads along the radial nerve cord.

Project started: 1948.

Duration: 2 years.

JAMAICA, Private Research (SM, IJ, Kingston). Distribution of Sphingidae in the Antillean-Caribbean Region.  
Cary, Margaret (Mrs.)

[ 19 ( 57 ) ]

A comparative study of the Sphingidae (Lepidoptera) through the West Indies (Florida to Venezuela), including their distribution and variation in the various islands.

During 1949 more material was brought together, particularly from Jamaica and Trinidad. In collaboration with Mr. J. Cadbury, Mrs. Cary worked in Venezuela during June and July. A portion of the collection which results from this project will be deposited at the Science Museum.

Project started: 1947.

Duration: to 1951.

JAMAICA, Private Research (SM, IJ, Kingston). A study of the land mollusca of Jamaica. Jacobson, M.K.; Alcalde Ledón, O.

[ 20 ]

To make as complete a survey as possible and compile an up-to-date list of the species of land mollusca found in Jamaica.

Six weeks of field work during 1949 and a considerable amount of bibliographical investigation have launched the undertaking.

Project started: 1949.

**APPENDIX**

**Project listed in the 1948 Year Book  
for which no new information is available**

## APPENDIX

### GEOLOGY

SURINAM, GMS, Paramaribo. Geological survey of Surinam. Schols, H.;  
et al.

[ 21 ( 781 ) ]

To investigate the geology and prepare a geological map of Surinam.

Project started: 1943.

### ZOOLOGY

JAMAICA, SM, IJ, Kingston. Study of the birds of Jamaica. Tordoff, H.B.;  
Lewis, C.B.

[ 22 ( 526 ) ]

The study of the birds of Jamaica, including the preparation of a study collection for the Museum and the production of a Guide to the Birds of Jamaica, primarily for local use.

Project started: 1946.

JAMAICA, Private Research (SM, IJ, Kingston). Study of the genus  
Fleurodonte (Mollusca) in Jamaica. Kimball, D.

[ 23 ( 524 ) ]

To ascertain the evolution, distribution and status of the members of this genus of land mollusca.

Project started: 1945.

**INDEX**

**21**

(Numbers quoted are project numbers)

- Aborigines 1,2  
 Alcalde Ledón, O. 20  
Amphisbaena 17  
 Anisotropic dielectric constants 14  
 Anolis 16  
 Anthropology 1-4  
 Anthro pometric measurements 2,3  
 Antigua 11  
 Appendix 21-23  
 Arawak affinities 1,2  
 Art 4  
 Asprey, G.F. 7
- Baker, R.E.D. 9  
 Biological status 3  
 Biology 3-6  
 Birds 22  
 Bonaire 11  
 Botany 7-9  
 Bowen, F.H. 12  
 Bracewell S. 10  
 British Guiana 4,10  
 British Guiana Museum 4
- Cadbury, J. 19  
 Cade, R. 13,14  
 Cary, Margaret (Mrs.) 19  
 Cayman Islands 6  
 Cheesman, E.L. 9  
 Christman, R.A. 11  
 Curacao 5,11
- Dengo, G. 11  
Diadema antillarum 18
- Economic Science 4  
 Electrodynamics 13  
 Electronic energy levels 12  
 Electrostatic forces 14  
 Ellipsoid method 14
- Fauna 5,6  
 Ferns 8  
 Flora 5,6,8,9
- Gases 15  
 Geckos 16  
 Geological maps 10,21  
 Geological surveys 10,11,21
- Geology 10,11,21  
 Geophysical investigations 11  
 GMS, Surinam 21  
Gonatodes fuscus 16  
 GSD, British Guiana 10
- Harper, W.F. 2  
 Herbarium studies 8  
 Hess, H.H. 11  
 History 4  
 Howard, R. 1  
 Hummelinck, P. Wagenaar 5
- ICTA, Trinidad 9  
 Ionised gases 15
- Jacobson, M.K. 20  
 Jamaica 1,2,6,7,8,12-20,22,23
- Kimball, D. 23
- Land mollusca 20,23  
 Lepidoptera 19  
 Lewis, C.B. 1,2,6,22
- MacLachlan, J.C. 11  
 Margarita 11  
 Maxon, William R. 8  
 Maxwell, J.C. 11  
 Microwave technique 15  
 Millott, N. 18  
 Mineral resources 10  
 Mollusca 20,23  
 Morant Cay 6
- Natural history 4  
 Natural resources 4  
 Natural Sciences 1-23  
 NWNA, Curacao 5
- Pedro Cay 6  
 Physics 12-15  
Pleurodonte 23  
 Proctor, G.R. 8  
 Puerto Rico 3  
 Pumphrey's interpretation 16  
 PU, New Jersey 11

- Reptiles 16,17  
 Roots 7  
 Roth, Vincent 4  
  
 Schols, H. 21  
 Shapiro, Harry L. 3  
 Simmonds, N.W. 9  
 Singh, Ram S. 4  
 Skeletal remains 2  
 Smith, R.J. 11  
 SM, Jamaica 1,6,8,19,20,22,23  
 Snyder's theory 13  
Sphaerodactylus 16  
Sphingidae 19  
 Sprinks, M. 15  
 SSRC, UPR 3  
 St. Bartholomew 11  
 St. Martin 11  
 Surinam 21  
  
 Tissue culture 7  
  
 Tobago 9,11  
 Tordoff, H.B. 22  
 Trinidad 9  
Typhlops jamaicensis 16  
  
 UCWI, Jamaica 2,7,12-18  
 Underwood, G.L. 16,17  
 U.S.A. 11  
  
 Vascular system 17  
 Venezuela 11,19  
  
 Wall's hypothesis 16  
 West Indies 11,19  
 Williams, R.O. 9  
  
 YU, Connecticut 1  
  
 Zangerl's view 17  
 Zoology 16-20,22,23

**PART II**  
**RESEARCH INSTITUTIONS AND PERSONNEL**



# RESEARCH INSTITUTIONS AND PERSONNEL

## BRITISH GULANA

### Geological Survey Department, Georgetown

S. Bracewell, B.Sc., D.I.C., A.R.C.S., A.Inst.M.M., Director.  
C.G. Dixon, B.Sc. Senior Geologist.  
E.R. Pollard, B.Sc., Geologist.  
G. Henderson, B.Sc., Geologist.  
J. Hamilton, B.Sc., Geologist.  
D.O. Pollard, Scientific Assistant.

### The British Guiana Museum, Georgetown

Hon. Vincent Roth, Curator.  
Ram Singh, M.B.O.U., Assistant Curator and Taxidermist.

## JAMAICA

### University College of the West Indies, Mona

H.R.H. the Princess Alice, Countess of Athlone, G.C.V.O., G.B.E., V.A.,  
Chancellor.  
T.W.J. Taylor, C.B.E., M.A., D.Sc., Principal.  
P.M. Sherlock, B.A., Vice Principal & Director of Extra-Mural Studies.  
H. Holdsworth, M.A., F.L.A., Librarian.

### Department of Botany

G.F. Asprey, M.Sc., Ph.D., Professor of Botany.  
Mrs. E. Robertson, B.Sc., Lecturer.  
P.B. Hutchinson, M.Sc., Asst. Lecturer.

### Department of Chemistry

C.H. Hassall, M.Sc., Ph.D., F.R.I.C., Professor of Chemistry.  
L. Wong, B.A. (Miss), Research Assistant.  
S.L. Martin, M.Sc., F.R.I.C., Lecturer.  
A.E. Lippman, B.Sc., M.Sc., Asst. Lecturer.

### Department of Mathematics

L.R.B. Robinson, M.A., Lecturer.

### Department of Zoology

N. Millott, M.Sc., Ph.D., Professor of Zoology.  
J.J. Rankin, B.Sc. (Miss), Lecturer.  
G.L. Underwood, B.Sc., Asst. Lecturer.

Department of Physics

F.H. Bowen, M.A., Ph.D., D.I.C., Senior Lecturer in Physics.  
R. Cade, M.Sc., Lecturer.  
M.E. Sprinks, B.Sc., Asst. Lecturer.

Department of Anatomy

W.F. Harper, M.D., B.Sc., Ph.D., F.R.S.E., Professor of Human Anatomy.

Department of Physiology and Biochemistry

I.F.S. Mackay, M.Sc., Ph.D., L.R.C.P., Professor of Physiology.  
S.J. Patrick, M.A., Ph.D., Senior Lecturer in Biochemistry.

Department of Pathology

K.R. Hill, M.D., M.B., B.S., M.R.C.S., L.R.C.P., A.R.I.C., Professor of Pathology.  
K. Rhodes.

Department of Modern History

J.H. Parry, M.B.E., Ph.D., M.A., Professor of Modern History.

Department of Modern Languages

M. Sandmann, M.A., D.Phil., D.Litt., Professor of Modern Languages.

Department of English

A.K. Croston, M.A., Professor of English.

Institute of Social and Economic Research

H.D. Huggins, M.Sc., M.A., Ph.D., Director.  
G.E. Cumper, B.A., Research Assistant.  
N.M. Sifleet, B.Sc. (Miss), Research Assistant.  
L. Braithwaite, B.Sc., Research Assistant.

Science Museum Institute of Jamaica, Kingston

C.B. Lewis, B.A., Curator.  
R.P. Bengry, M.Sc., Assistant Curator.  
Amy von de Porten (Mrs), Botanist.

## NETHERLANDS WEST INDIES

Natuurwetenschappelijke Werkgroep Nederlandse Antillen  
(Natural Science Study Group in the Netherlands Antilles)  
Curacao, Willemstad

G.J.F. Breedveld (Ir) President.  
 J.W.M. Diemont, Veterinary Surgeon, Vice-President.  
 J.G. de Jong, Secretary.  
 B.A. Bitter, Treasurer.

Natuurwetenschappelijke Studiekring Voor Suriname en Curacao  
(Foundation for Scientific research in Surinam and Curacao)  
Holland, Utrecht (Zoological Laboratory)

A.A. Pulle, Prof. Dr. President.  
 J. Lanjouw, Prof. Dr., Vice-President.  
 P. Wagenaar Hummelinck, Dr., Secretary.  
 J.H. Westermann, Dr., Treasurer.

## UNIVERSITY OF PUERTO RICO

College of Agriculture & Mechanic Arts, Mayaguez, P.R.

Faculty of Science

Miguel Wiewall Jr., E.E., M.A., M.S., D.Sc.

Biology Department

José Antonio Ramos, B.S., M.S. Professor of Biology and Chairman of the Dept.  
 Amelia Arana-Soto, B.S., Cert. M.T., Instructor of Biology.  
 Virgilio Biaggi Jr., B.S.A., M.S., Ph.D., Assoc. Prof. of Zoology & Entomology.  
 J.A. Ferrer-Monge, B.S.A., M.A., Assistant Professor of Biology.  
 Margarita García, B.S., Assistant Instructor of Biology.  
 Arturo González-Mas, B.S., Instructor of Biology.  
 Herminio Lugo-Lugo, B.A., M.S., Instructor of Biology.  
 J. Maldonado-Capriles, B.S.A., M.San.Sc., Assistant Professor of Biology.  
 Norman T. Mattox, A.B., M.S., Ph.D., Visiting Professor of Zoology.  
 José Muratti<sup>\*</sup>, B.S.A., Instructor of Biology.  
 Juan A. Rivero, B.S.A., Instructor of Biology.  
 Luis Roure-Riera, B.S.A., Instructor of Biology.  
 Cándida Rosa Toro, B.S., Assistant Instructor of Biology.  
 Germaine L. Warmke, B.S., M.A., Assistant Professor of Biology.

\* On leave

Physics Department

Braulio Dueño, B.S., M.A., Professor of Physics and Chairman of the Dept.  
 José R. Lebrón, B.S.M.E., Instructor of Physics.  
 J. Medina-Hernández, B.S., M.S., Associate Professor of Physics.  
 Willie Ocasio, B.S., Instructor of Physics.  
 Eddie Ortiz-Muniz, B.S., M.S., Ph.D., Instructor of Physics.  
 Santiago Ramírez, B.S., Instructor of Physics.  
 Angel M. Tirado, B.S.E.E., Instructor of Physics.

Mathematics Department

Mariano García-Rodríguez, B.S., M.A., Ph.D., Professor of Mathematics and  
 Chairman of the Department.  
 Gladys Aponte, B.S., Instructor of Mathematics.  
 Asunción Bayó, B.S., Instructor of Mathematics.  
 Harry B. Carter, B.A., M.A., Associate Professor of Mathematics.  
 America C. Martínez, B.S., Instructor of Mathematics.  
 Alfonso Dávila, B.S., Instructor of Mathematics.  
 Luis N. Escabi<sup>‡</sup>, B.S., Instructor of Mathematics.  
 Carmina Fernández<sup>‡</sup>, B.S., Instructor of Mathematics.  
 Elsie Homs, B.S., Instructor of Mathematics.  
 Jacob B. Neiman, B.S., Ch.E., M.A., Assistant Professor of Mathematics.  
 Roberto Ortiz, B.S., Associate Professor of Mathematics.  
 Juan de D. Quinones, B.A., M.A., Assistant Professor of Mathematics.  
 María M. Ramírez, B.A., M.A., Assistant Professor of Mathematics.

Chemistry Department

J.L. Martínez-Picó, B.S., M.S., Associate Professor of Chemistry and  
 Chairman of the Department.  
 Rafael Díaz-Sosa, B.S., Instructor of Chemistry.  
 J. Hernández-Mora<sup>‡</sup>, B.S., Assistant Professor of Chemistry.  
 Felipe de J. Quiñones, B.S., Instructor of Chemistry.  
 María A. López-Inígo, B.S., Instructor of Chemistry.  
 Hernán Pérez-Milán, B.S.A., B.S., M.S., Assistant Professor of Chemistry.  
 Fred Soltero-Harrington, B.S.Ch.E., Instructor of Chemistry.  
 Alice M. Souffront Huyke, B.S., Assistant Instructor of Chemistry.  
 Francisco García-Sharp, B.S., Instructor of Chemistry.  
 Consuelo Suárez, B.S., Instructor of Chemistry.  
 George B. Truchelut, A.B., M.S., Visiting Professor of Chemistry.  
 Leila Zayas-Pizarro, B.S., Instructor of Chemistry.

## CARIBBEAN COMMISSION

Research Branch, Trinidad

Eric Williams, B.A., D.Phil., Deputy Chairman, Caribbean Research Council.  
 J.E. Heesterman, Chemical Engineer, Consultant for Industrial Development.

‡ On leave

RESEARCH INSTITUTIONS AND PERSONNEL

31

C.K. Robinson, M.B.E., D.I.C.T.A., M.S., Executive Secretary, (Agricultural Economics).  
P.H.J. Lampe, M.D. (Amsterdam), Executive Secretary (Public Health).  
C.J. Burgess, M.Com., Executive Secretary (Economics).  
F.H. Beyerinck, Dr.ier. pol., Market Analyst.  
A.I. Morais, F.S.S., Statistician.  
Edith L. Bornn, A.B., LL.B., Research Secretary.  
William Davila, Research Secretary.

**PART III**  
**SELECT BIBLIOGRAPHY**

A bibliography of research studies published in 1948 and 1949. Limited to research in the fields of natural sciences conducted in the Caribbean or with reference to Caribbean territories and to research in these fields in countries adjacent to the Caribbean which may be of interest to research workers in the Caribbean.

---

BIOLOGY

Lewis, C. Bernard, "The history of the Pedro and Morant Cays", Jamaica Hist. Rev., Vol., No. 3, Dec. 1948, pp. 302-309.

BOTANY

Bates, M., "Climate and vegetation in the Villavicencio region of eastern Colombia", Geogr. Rev., Vol. 38, 1948, pp. 555-574. (Abstr. No. 257, Herb. Abstr., Vol. 19, No. 1, Feb. 1949, p. 55).

Eggler, W.A., "Plant communities in the vicinity of the volcano El Paricutin, Mexico, after two and a half years of eruption", Ecology, Vol. 29, No. 4, 1948, pp. 415-436. (Abstr. No. 2496, For. Abstr., Vol. 10, No. 4, June 1949, p. 472).

Fries, R.E., "Contributions to the flora of tropical America: XLVII. Annonaceae new to British Guiana", Kew Bull. Vol. 2, 1948, pp. 229-235. (Abstr. No. 646 f, Hort. Abstr., Vol. 19, No. 1, Mar. 1949, p. 75).

Howard, R.A., "Atkinsia gen. nov., Thespesia, and related West Indian general of the Malvaceae", Bull. Torrey Bot. Cl., Vol. 76, 1949, pp. 89-100. (Abstr. No. 1930, Plant Breeding Abstr., Vol. 19, No. 3, 1st July 1949, p. 602).

Johnston, A. "The germination of malvaceous seeds", Trop. Ag. (Trinidad), Vol. 26, Nos. 1-6, Jan.-June 1949, p. 63.

Marie-Victorin(Fr.) "Nouvelle études taxonomiques sur la flore de Cuba", [New taxonomic studies of the Cuban flora (including the genera. Belotia and Spathelia)], Contr. Inst. Bot. Univ. Montreal, No. 63, 1948, pp. 77. (Abstr. No. 2501, For. Abstr., Vol. 10, No. 4, June 1949, p. 473).

Murrill, W.A., "Florida amanitas", Lloydia [Cincinnati], Vol. 11, No. 2, 1948, pp. 99-110. (Abstr. No. 16323, Biol. Abstr., Vol. 23, No. 5, May 1949, p. 1660).

Murrill, W.A., "Florida boletes", Lloydia [Cincinnati], Vol. 11, No. 1, 1948, pp. 21-35. (Abstr. No. 16322, Biol. Abstr.; Vol. 23, No. 5, May 1949, p. 1660).

Woodson, R.E. Jr.; Schery, R.W., "Flora of Panama. Part V. Fascicle 1. Lauraceae, Hernandiaceae, Papaveraceae, Cappariaceae, Cruciferae", Ann. Mo. Bot. Gnd., Vol. 35, No. 1, 1948, pp. 1-106. (Abstr. No. 932, For. Abstr. Vol. 10, No. 2, Dec. 1948, p. 172).

#### GEOLOGY

"Aluminous lateritic soil of Haiti", Bull. Imp. Institute, No. 46, 1948, p. 386. (Abstr. No. 1588, Soils and Fert., Vol. 12, No. 4, 1949, p. 316).

Barton, C.J., "Photometric analysis of phosphate rock", Anal. Chem., Vol. 20, 1948, pp. 1068-1073. (Abstr. No. 555, Soils and Fert., Vol. 12, No. 2, 1949, p. 114).

Fries, C., Jr.; Schmitter, E., "Tin-bearing placers near Guadalcázar, State of San Luis Potosí, Mexico", U.S. Geol. Survey Bull., 960-D, 1948, pp. 109-148; Com. Direct. Invest. Recursos Mineral. Mex. Vol. 17, 1948, pp. 1-50. (Abstr. Chem. Abstr., Vol. 43, No. 13, July 10, 1949, col. 4982-4983).

Gallagher, D.; Perez Siliceo, R., "Geology of the Huahuaxtla mercury district, State of Guerrero, Mexico", U.S. Geol. Survey Bull., 960-E, 1948, pp. 149-173. (Abstr. Chem. Abstr., Vol. 43, No. 13, July 10, 1949, col. 4981).

Happel, L., "Oilfields of the Shell group in Western Venezuela", Erdol U. Kohle, Vol. 1, 1948, pp. 201-202. (Abstr. British Abstr., B I, May 1949, col. 341).

White, D.E., "Antimony deposits of Soyatal District, State of Queretaro, Mexico", U.S. Geol. Survey Bull., 960-B, 1948, pp. 35-86. (Abstr. Chem. Abstr., Vol. 43, No. 13, July 10, 1949, col. 4982).

#### METEOROLOGY

Merino y Coronado, J., "El régimen de lluvias de San José", [Rainfall at San José (Costa Rica)], Rev. Ag. (Costa Rica), Vol. 20, 1948, pp. 89-90. (Abstr. No. 386, Field Crop Abstr., Vol. 2, No. 1, Jan. 1949, p. 74).



## PHYSICS

- Cade, R., "Quantum Mechanics of Canonical Field Variables", Nature (London), Vol. 164, No. 4173, Oct. 22nd 1949. pp. 713-714.

## ZOOLOGY

- Allen, E. Ross, "Cottonmouth moccasin in Florida", Herpetologica, Vol. 4 (Suppl. I), 1948, pp. 1-16. (Abstr. No. 17679, Biol. Abstr., Vol. 23, No. 5, May 1949, p. 1784).
- Dunn, E.R., "Relative abundance of some Panamanian snakes", Ecology, Vol. 30, No. 1, 1949, pp. 39-57. (Abstr. No. 17685, Biol. Abstr., Vol. 23, No. 5, May 1949, p. 1784).
- Fennah, R.G., "Autecological notes on three species of Aeneolamia (Homoptera: Cercopoidea)", Annals and Mag. of Nat.Hist., Vol. 12, No. 2, 1949, pp. 703-726.
- Fennah, R.G., "New genera and species of Neotropical Cercopoidea (Homoptera)", Annals and Mag. of Nat. Hist., Vol. 12, No. 1, 1948, pp. 605-620.
- Jackson, R.W., "New subspecies of Helicostyla from Mindoro, and of Polygyra from Florida", Nautilus, Vol. 62, No. 2, 1948, pp. 40-41. (Abstr. No. 17419, Biol. Abstr., Vol. 23, No. 5, May 1949, p. 1761).
- Legros, C., "Dytiscides nouveaux de la Guadeloupe (Col.)" [New Dytiscides from Guadeloupe], Bull. Soc. Ent.(France) Vol. 53, No. 7-8, 1948, pp. 103-107. (Abstr. No. 17506, Biol. Abstr., Vol. 23, No. 5, May 1949, p. 1769).
- Maldonado-Koerdell, M., "Discovery of another cotype of Bathysiredon dumerilii (Dugès), 1870", Chicago Acad. Sci. Nat. Hist. Misc., Vol. 23, 1948, pp. 1-3. (Abstr. No. 1761, Biol. Abstr., Vol. 23 No. 5, May 1949, p. 1783).
- Mello-Leitao, C. de., "Contribuicao ao conhecimento da fauna araneologica da Guianas", [Contribution to the knowledge of the araneological fauna of the Guianas], An. Acad. Brasil Cienc., Vol. 20, No. 2, 1948, pp. 151-196. (Abstr. No. 17480, Biol. Abstr., Vol. 23, No. 5, May 1949, p. 1767).
- Taylor, E.H., "New Costa Rican salamanders", Proc. Biol. Soc. Washington, Vol. 61, 1948, pp. 177-180. (Abstr. No. 17677, Biol. Abstr., Vol. 23, No. 5, May 1949, p. 1784).