WEBBIA Journal of Plant Taxonomy and Geography

Firenze University Press
https://oaj.fupress.net/index.php/webbia

OPEN ACCESS

Citation: Morey, V., Lahn, E., Elton, C., Ibáñez, A., Basset, Y. & Francisco-Ortega, J. (2025). David Fairchild as a naturalist and advocate for tropical biology research: his 1924 trip to Panama. *Webbia. Journal of Plant Taxonomy and Geography* 80(1): 15-41. doi: 10.36253/jopt-16917

Received: November 29, 2024

Accepted: February 1, 2025

Published: April 17, 2025

Data Availability Statement: All relevant data are within the paper and its Supporting Information files.

Competing Interests: The Author(s) declare(s) no conflict of interest.

Editor: Riccardo M. Baldini

ORCID
VM: 0009-0009-2375-2858
CE: 0009-0009-0220-5097
AI: 0000-0002-3724-838X
YB: 0000-0002-1942-5717
JF-O: 0000-0002-5719-7188

David Fairchild as a naturalist and advocate for tropical biology research: his 1924 trip to Panama

Valeria Morey[1], Eleanor Lahn[2], Charlotte Elton[3], Alicia Ibáñez[3], Yves Basset[4], Javier Francisco-Ortega[1,5,*]

[1] *Institute of the Environment, International Center for Tropical Botany, Department of Biological Sciences and Latin American and Caribbean Center, Florida International University, University Park, Miami, Florida 33199, USA*
[2] *The Kampong, National Tropical Botanical Garden, 4013 South Douglas Road, Coconut Grove, FL 33133, USA*
[3] *Centro de Estudios y Acción Social Panameño, Apartado Postal 0819-10043, Ciudad de Panamá, República de Panamá*
[4] *Smithsonian Tropical Research Institute, Apartado Postal 0843-03092, Balboa, Ancón, Ciudad de Panamá, República de Panamá*
[5] *Kelly Research Fellow, Montgomery Botanical Center, 11901 Old Cutler Road, Coral Gables, Florida 33156, USA*
* Corresponding author. E-mail: ortegaj@fiu.edu

Abstract. Plant explorer David Fairchild (1869–1954) and four prestigious American zoologists [Nathan Banks (1868–1953), Curt P. Richter (1894–1988), William M. Wheeler (1865–1937), and James Zetek (1886–1959)] gathered at the newly established Barro Colorado Island Laboratory in Panama to conduct field studies from late July to early August 1924. This visit occurred just weeks after this field station's official inauguration. Fairchild traveled to Panama with his son, Graham B. Fairchild (1906–1994), and while returning from Panama to the U.S. aboard the *SS Ulua*, he prepared a 21-page handwritten narrative of this trip. This unpublished manuscript is housed at Fairchild Tropical Botanic Garden and has been transcribed here with annotations. A large component of the manuscript focuses on entomological findings, along with Fairchild's advocacy and support for tropical biology studies. The document includes philosophical reflections that Fairchild made on human behavior and biological processes inspired by his entomological observations and discussions he had with biologists at the station. The document shows Fairchild as a broad-based naturalist who played a key role in the initial establishment of one of the most famous tropical field stations in the world. Fairchild carried plant material from Cuba (5 accessions, 5 species) and Panama (23 accessions, 20 species) on his trip back to the U.S. His narrative discusses technical challenges involved in transporting living material in Wardian cases. Entomological findings were published in two papers by Wheeler upon his return to the U.S. Fairchild delivered a talk on mangosteens (*Garcinia* sp., Clusiaceae) in Ancon a few days before his departure from Panama. During his stay in Panama, Fairchild also met with the curator of living collections of Summit Gardens, Holger P. Johansen (1898–1935), along with Panama Canal Zone governor Jay J. Morrow (1870–1937), orchid specialist and horticulturist Charles Wesley Powell (1854–1927), and Chief Sanitary Inspector J. B. Shropshire. A total of 46 photos taken by Fairchild were located

during this study. In addition to these photographs, our research involved looking into newspaper reports from Panama and Cuba, as well as USDA germplasm inventories from 1924. The main botanical highlights recorded by Fairchild concern insect-plant interactions found between ants and the legumes *Inga* sp. and *Vachellia melanoceras* (Beurl.) Seigler & Ebinger, as well as the pollination biology of the orchid *Catasetum viridiflavum* Hook.

Keywords: Smithsonian Tropical Research Institute, botanical history, Central America, tropical forests, Neotropics.

INTRODUCTION

Famous plant explorer David Fairchild (1869–1954; Fig. 1) conducted extensive fieldwork in the tropics between 1898 and 1948 (Fairchild undated, 1928, 1930; Korber 2016). His first expeditions as a plant hunter took place between January 6, 1898 (San Francisco, California) and August 13, 1903 (Liverpool, England) and were funded by the wealthy American philanthropist Barbour Lathrop (1847–1927), as described by Fairchild (undated, 1938) and Douglas (1973). Fairchild's last botanical expedition took place from March to April of 1948, targeting Venezuela and Colombia (Korber et al. 2016). Among these voyages he visited Central America six different times: in 1899, 1921, 1924, 1933, 1941, and 1944 (Fairchild undated; Lisio et al. 2024). Two previous undergraduate student research projects from Florida International University carried out by Lisio et al. (2024) and Burgos Soler et al. (in press) provide insights on his 1941 (Panama and Guatemala) and 1944 (Guatemala and Honduras) visits to this region, respectively.

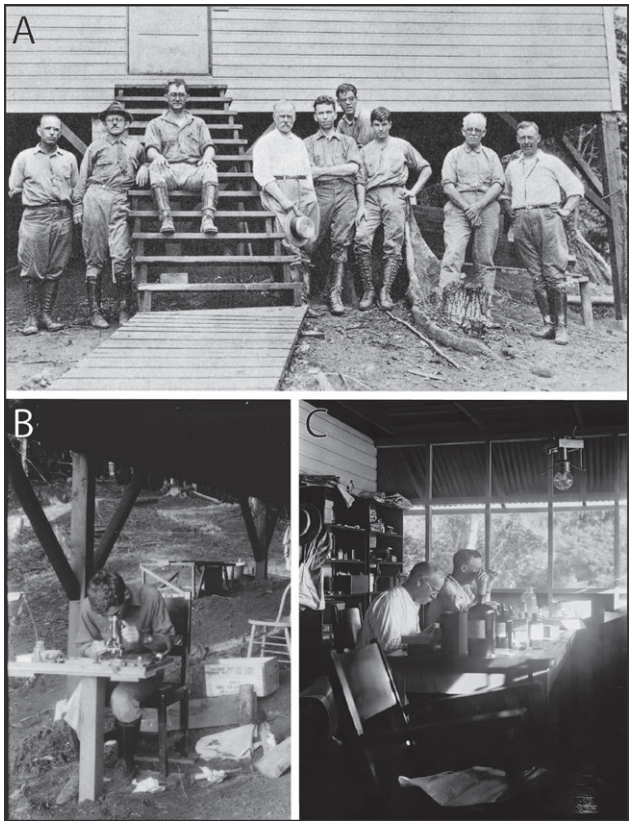


Figure 1. Participants hosted in the Barro Colorado Island Laboratory during the 1924 trip of Fairchild to Panama. (A) From left to right: Gordon Stanhope Dodds, James Zetek, Ignacio Molino, Nathan Banks, George C. Wheeler, Graham Bell Fairchild, Frederick Burgess, David Grandison Fairchild, and William Morton Wheeler, at Barro Colorado Island, courtesy of Smithsonian Institution Archives. Image # 92-12929.– Record Unit 9559, Box 1, Graham Bell Fairchild Oral History Interview. All people depicted in this photograph except Dodds are mentioned in Fairchild's (1924a) report. (B) Graham B. Fairchild examining specimens (Photo 00078), (C) Nathan Banks (foreground) and William M. Wheeler (background) preparing insect specimen (Photo 00080). Further details for individuals posing in these photographs are found in Table 3. B and C: Courtesy of Fairchild Tropical Botanic Garden.

Here, we present the results of a research project focused on the voyage Fairchild made to Panama in 1924 (Fig. 1). The research involved (1) examining documents and photographs found in the Archives and Library of Fairchild Tropical Botanic Garden (ALFTBG), (2) reviewing plant collection records in the USDA National Germplasm System, and (3) analyzing newspaper articles from Havana and the Panama Canal Zone from 1924. This work is part of an undergraduate student research program jointly supported by two units of Florida International University: the Global Learning Medallion program and the Kimberly Green Latin American and Caribbean Center. Preliminary findings of this study were presented as a poster displayed during the "Barro Colorado Island 100 Years" symposium held June 16–20, 2024, celebrating the centennial of the Barro Colorado Laboratory, Smithsonian Tropical Research Institute (Elton et al. 2024; Fig. 2).

ARCHIVAL AND BIBLIOGRAPHIC RESEARCH RESULTS

The main finding of our research was an unpublished 21-page handwritten notebook by Fairchild, housed in the ALFTBG (Fairchild 1924a), where he detailed his 1924 trip. A facsimile of this report is shown

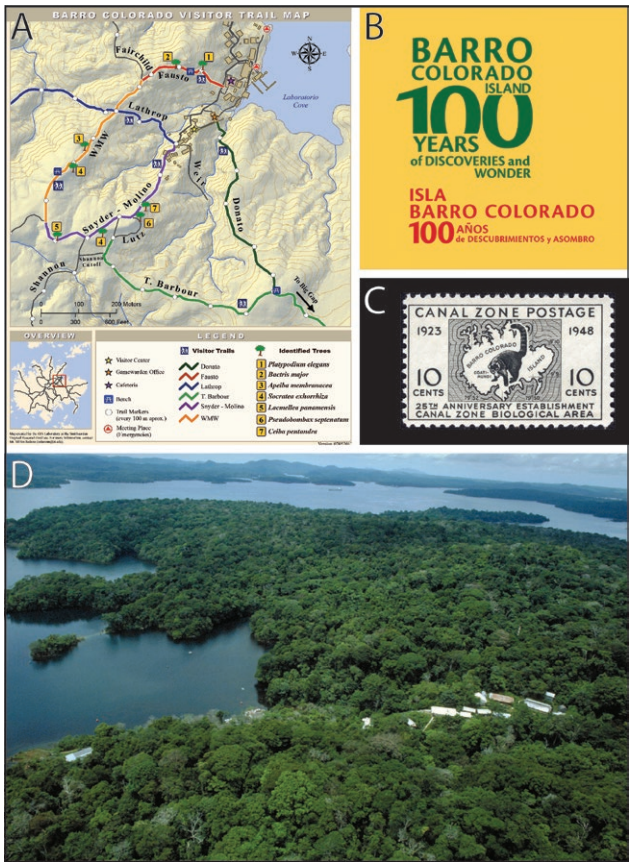


Figure 2. Images pertinent to the Barro Colorado Island Laboratory, Smithsonian Tropical Research Institute. (A) Barro Colorado Island map showing the visitor trails. (B) Flyer celebrating the 100-year anniversary of this laboratory in 2024. (C) Postage stamp issued by the Panama Canal Zone in 1948 celebrating the 25-year anniversary of the establishment of the biological reserve on this island (see relevant correspondence in Fig. 3). (D) Aerial view of Barro Colorado Island showing the laboratory facilities, 2024. (A), (B), and (D) courtesy of Smithsonian Tropical Research Institute.

in Online Supplementary Appendix 1, and an annotated transcript of this manuscript is presented in Appendix 1. Additionally, a total of 42 photographs were located (Table 1) in the ALFTBG and are shown in Online Supplementary Appendix 2. Four more photographs by Fairchild were published by Wheeler (1924, 1925) concerning entomological observations (Table 1). Fairchild had a broad interest in natural history, and in the early 1910s, he designed a special camera he called Long Tom, that could capture close-up photographs of specimens (Fairchild and Fairchild 1914; Mosely 2012; Tasker 2014; Fig. 3). He carried this camera to Panama (Fairchild 1924a: 3; caption of Photo 00078), using it to obtain 15 photos of a tarantula (*Sericopelma* sp.), fungus-growing ant nests (eight photos), an insect pupae, three species of insects, and two plant species (Fig. 3, Table 1). Taxonomic indexes for the invertebrates (Appendix 2) and plants (Appendix 1) encountered by Fairchild are also provided. This required us to update the scientific names reported by him, so throughout this paper we utilize the current accepted names that are used to identify these organisms.

We also reviewed relevant correspondence and documents by Fairchild housed in the ALFTBG that could provide insights on the preparation and objectives of this voyage. This search yielded a total of 17 letters and 2 documents written between December 1923 and August 1924 (Figs. 4–5). These documents are part of the "Barro Colorado Laboratory" folder, in the cabinet files at ALFTBG, which contain Fairchild's manuscripts sorted by topics of significance to him. Two additional letters that Fairchild wrote to Barbour Lathrop from Panama (dated July 22 and August 10, 1924) gather further details regarding this trip. These two letters are located in a folder labeled "Lathrop, Barbour 1924–1927", inside the correspondence box "Lathrop 1924–1927 – Lion".

As part of our bibliographic studies, through the Interlibrary Loan Service of the University of Florida Library, we obtained microfilms for the 1924 issues of the *Star & Herald*, a newspaper from Panama, mentioned in Fairchild's (1924a: 21) travel report[1]. We aimed to assess the extent to which Fairchild's activities during his visit were covered by Panama's local media. This bibliographic research shows that seven short news-notes published between July 19 and August 8 reported aspects of Fairchild's trip. Scans of these news-notes are presented in Online Supplementary Appendix 3. Fairchild's report (1924a: 4, 19) mentions a visit to Cuba during his voyage from the U.S. to Panama, as well as this island as a source of plant material that was carried with him during his trip from Cristobal, Panama to New York. To confirm that Cuba was part of Fairchild's itinerary to or from Panama, we consulted the issues of the Havana newspaper *Diario de La Marina* for July–August 1924, accessible on one of the webpages of the *Ministerio de Cultura y Deporte* of Spain. This newspaper provided daily records for vessels that called at Havana on their routes. Last, we examined the USDA's online germplasm database and inventory reports to determine which plant materials collected during this voyage reached the plant material repositories of the federal agency. The internet addresses for the three online supplementary appendixes, along with other relevant websites, are listed in Table 2.

[1] Page 21 of Fairchild's (1924a) report includes a clipping of a news-note published in this newspaper that highlights a talk on mangosteens to be delivered by Fairchild in Balboa.

Table 1. Photographs pertinent to the visit made to Panama by David Fairchild in 1924.

Photo description	Locality	Date	Photo number in Fairchild Tropical Botanic Garden records / Figure number in this paper
Graham Fairchild at the Celotex microscope table. To the right is shown the end of the Long Tom Camera. It was near this camera end that I [David Fairchild] killed a fer de lance 3 feet long late one afternoon	Barro Colorado	Undated	00078 / 1
Interior of Barro Colorado Island Laboratory, dormitory. William M. Wheeler is eating his early banana. Frederick Burgess peering over his shoulder. Graham fast asleep	Barro Colorado	Undated	00079 / -
Interior of Barro Colorado Island Laboratory. Nathan Banks foreground, William M. Wheeler background. Preparing insect specimen in the early morning	Barro Colorado	July 29	00080 / 1
Early morning scene of forest near Barro Colorado Island Laboratory	Barro Colorado	Undated	00533 / -
**Catasetum viridiflavum* Hook. (Orchidaceae) pollinia, found on old stump	Gatun Lake	Undated	00534 / -
Liana which is producing new roots. This giant liana I [David Fairchild] could not identify because I did not collect flowers or leaves. It had sent out roots which were pushing down at the rate of two inches or so a day and when I [David Fairchild] left were within 2 1/2 feet of touching the ground.	Barro Colorado	July 29	00535 / -
Wingless chicken	Unknown	Undated	00536 / -
*Tarantula [*Sericopelma* sp., Araneae, Theraphosidae]	Barro Colorado	July	00537 / 3
Wingless chicken	Unknown	Undated	00538 / -
Colony of warrior ants	Unknown	Undated	00539 / -
Boys swinging on the roots of a giant philodendron (*Philodendron lacerum* (Jacq.) Schott,[a] identified as *Philodendron* cf. *radiatum* Schott by T. Croat (Missouri Botanical Garden, Araceae)	Barro Colorado	Undated	00540 / -
**Apterostigma fairchildii*[b] (Hymenoptera, Formicidae, Attini) mushroom garden	Unknown	Undated	00541 / -
**Apterostigma collare* (Hymenoptera, Formicidae, Attini), fungus-growing ant. Petri dish nest of this species. Collected and arranged by W.M. Wheeler	Barro Colorado	Undated	00542 / -
*Fungus-growing ant *Trachymyrmex*[c] (Hymenoptera, Formicidae, Attini) mushroom garden.	Barro Colorado	July 29	00543 / -
*Fungus garden made by ant	Barro Colorado	July 31	00544 / -
*Fungus-growing ant *Trachymyrmex*[c] (Hymenoptera, Formicidae, Attini) mushroom garden.	Barro Colorado	July 29	00545 / -
**Cyphomyrmex strigosus* (Hymenoptera, Formicidae, Attini).[c,d] Fungus garden	Barro Colorado	August 2	00546 / -
Stingless bee nest. *Trigona* (Hymenoptera, Apidae, Meliponini)	Unknown	Undated	00547 / -
The devil's ant tree or bull horn acacia. *Acacia multiglandulosa* Schenck (accepted name *Vachellia melanoceras* (Beurl.) Seigler & Ebinger, Fabaceae). Views of the leaf tips, thorns, trees and of William M. Wheeler and James Zetek examining the trees	Marajal Jungle	July 27	00548 / -
*Leaf-cutting ant. *Atta cephalotes* (Hymenoptera, Formicidae, Attini)	Barro Colorado	July 29	00549 / 3
*Fungus garden in Petri Dish. *Sericomyrmex* (Hymenoptera, Formicidae, Attini) species of ant	Unknown	Undated	00550a / -
*Pupa of undetermined insect. It resembles a dead leaf in a most remarkable way with its peculiar leafy appendages. The living caterpillar feeds on a Convolvulaceae.	Barro Colorado	Undated	02038 / -
The devil's ant tree or bull horn acacia. *Acacia multiglandulosa* Schenck (accepted name *Vachellia melanoceras* (Beurl.) Seigler & Ebinger, Fabaceae).	Marajal Jungle near France Field	July 27	11794 / -
The devil's ant tree or bull horn acacia. *Acacia multiglandulosa* Schenck (accepted name *Vachellia melanoceras* (Beurl.) Seigler & Ebinger, Fabaceae).	Unknown	Undated	12321 / 11
The devil's ant tree or bull horn acacia. *Acacia multiglandulosa* Schenck (accepted name *Vachellia melanoceras* (Beurl.) Seigler & Ebinger, Fabaceae).	Unknown	Undated	12322 / -

(Continued)

Table 1. (Continued).

Photo description	Locality	Date	Photo number in Fairchild Tropical Botanic Garden records / Figure number in this paper
The devil's ant tree or bull horn acacia. *Acacia multiglandulosa* Schenck (accepted name *Vachellia melanoceras* (Beurl.) Seigler & Ebinger, Fabaceae).	Unknown	Undated	12325 / -
The devil's ant tree or bull horn acacia. *Acacia multiglandulosa* Schenck (accepted name *Vachellia melanoceras* (Beurl.) Seigler & Ebinger, Fabaceae).	Unknown	Undated	12326 / -
Trail through jungle	Barro Colorado	Undated	12327 / -
The devil's ant tree or bull horn acacia. *Acacia multiglandulosa* Schenck (accepted name *Vachellia melanoceras* (Beurl.) Seigler & Ebinger, Fabaceae).	Unknown	Undated	12328 / -
Insect nest [negative has deteriorated]	Unknown	Undated	12329 / -
Entrance to a nest of the kelep ant (*Ectatomma*[e] *tuberculatum*, Hymenoptera, Formicidae, Ectatommini)	Barro Colorado	July 20	00551[f] / -
Trail through jungle on Barro Colorado Island	Barro Colorado	July 19	00552[g] / -
Liana producing new root systems	Barro Colorado	July 29	00553 / -
Inga sp. (Fabaceae) showing extrafloral nectaries	Barro Colorado	July 29	00554[h] / -
*Leaf-cutting ant. *Atta cephalotes* (Hymenoptera, Formicidae, Attini). An *Atta* queen and her young nest in tin box arranged by William M. Wheeler slightly enlarged	Barro Colorado	Undated	00660 / -
Colony of warrior ants. *Eciton*[e] *hamatum* (Hymenoptera, Formicidae, Dorylinae)	Unknown	Undated	00662 / -[i]
Wingless fowl	Unknown	Undated	00663 / -
Catasetum viridiflavum Hook. Orchid which throws its pollen.	Unknown	Undated	00664 / 9
Hura[j] *crepitans* L. (Euphorbiaceae). Dead sand box tree. Destruction caused by termites. The tree was so eaten up by termites as to look like a gigantic honeycomb	Barro Colorado	August	00965 / -
Manicaria saccifera Gaertn. Remarkable forest of monkey cap palms. Graham Fairchild and Frederick Burgess posing	Near Clear Water River, Fort Sherman	August 7	01537 / 10
Wingless chicken. This specimen has no wings, and its thorax is reduced to a mere fraction of what one would expect to find in a bird of its size but the keel is still present	Balboa	July	02036 / -
Manicaria saccifera Gaertn. Monkey cap palms, Mr. Shropshire standing	Fort Sherman	August 7	12681 / -
*Courtship of the calobatas[k]	Barro Colorado	Undated	NA / -
*Saucers of honey. Extrafloral nectaries of young and just unfolded leaf of *Inga* sp.[l]	Barro Colorado	Undated	NA / -
*Soldier and small worker of *Eciton hamatum*[m]	Barro Colorado	Undated	NA / -

* Photos taken with the Long Tom camera.

[a] This is a Caribbean Island endemic. The species was misidentified by Fairchild (see Appendix 1, note 3).

[b] We could not locate the specific epithet "*fairchildii*" in the consulted literature. This genus of fungus-growing ants is not mentioned in Fairchild's (1924a) report.

[c] This genus of fungus-growing ants is not mentioned in Fairchild's (1924a) report.

[d] We could not locate the specific epithet *strigosus* in the consulted literature. It appears that Fairchild was referring to a species of the *C. strigatus* complex (Kempf 1964); accepted name *Mycetophylax strigatus*; however, this species does not reach Central America.

[e] This genus of ants is not mentioned in Fairchild's (1924a) report

[f] Photo published by Wheeler (1924: Fig. 8).

[g] Photo published by Wheeler (1925: Fig. 1).

[h] Photo published by Wheeler (1924: Fig. 8).

[i] Photo published by Wheeler (1925: Fig. 3).

[j] This genus of plants is not mentioned in Fairchild's (1924a) report.

[k] Photo published by Wheeler (1924: Fig. 10).

[l] Photo published by Wheeler (1924: Fig. 9).

[m] Photo published by Wheeler (1925: Fig. 4).

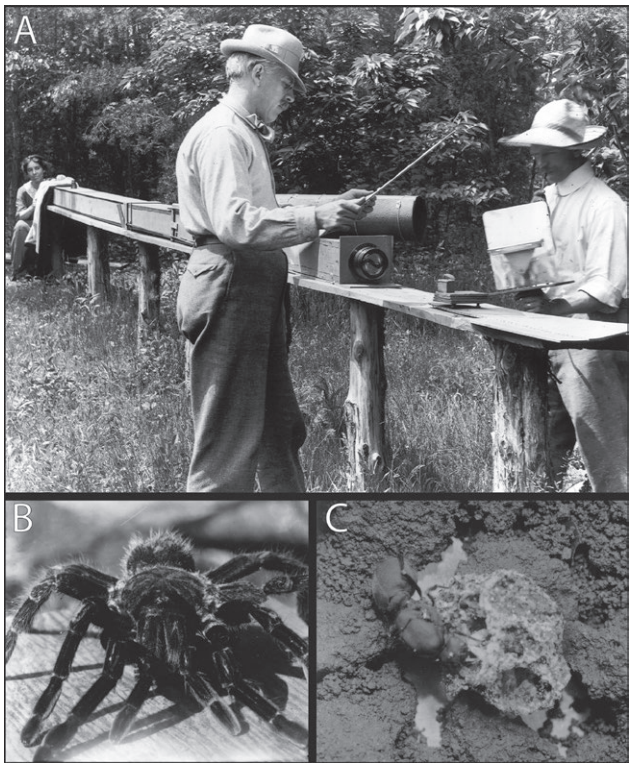
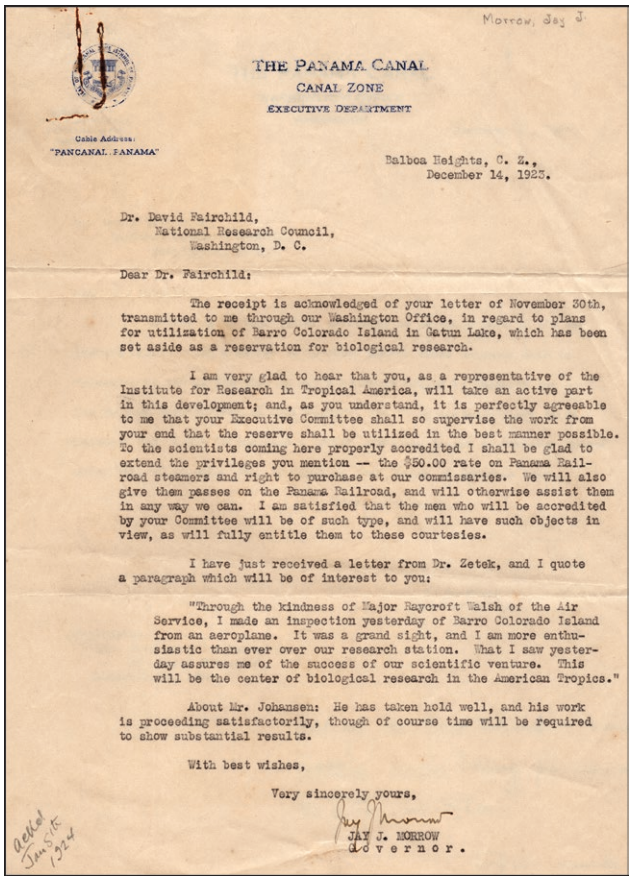


Figure 3. Images pertinent to the Long Tom Camera that was carried to Panama (year 1924) to take close-up images of organisms. (A) View of the camera as it was used in Bethesda, Maryland, unknown date. From left to right Marian Fairchild, David Fairchild, and Wills (Photo 00473). (B) *Sericopelma* tarantula, Barro Colorado Island (Photo 00537). (C) *Atta cephalotes* leaf-cutting ant (Photo 00549). Courtesy of Fairchild Tropical Botanic Garden.



Morrow, Jay J.

THE PANAMA CANAL
CANAL ZONE
EXECUTIVE DEPARTMENT

Cable Address:
"PANCANAL, PANAMA"

Balboa Heights, C. Z.,
December 14, 1923.

Dr. David Fairchild,
National Research Council,
Washington, D. C.

Dear Dr. Fairchild:

The receipt is acknowledged of your letter of November 30th, transmitted to me through our Washington Office, in regard to plans for utilization of Barro Colorado Island in Gatun Lake, which has been set aside as a reservation for biological research.

I am very glad to hear that you, as a representative of the Institute for Research in Tropical America, will take an active part in this development; and, as you understand, it is perfectly agreeable to me that your Executive Committee shall so supervise the work from your end that the reserve shall be utilized in the best manner possible. To the scientists coming here properly accredited I shall be glad to extend the privileges you mention -- the $50.00 rate on Panama Railroad steamers and right to purchase at our commissaries. We will also give them passes on the Panama Railroad, and will otherwise assist them in any way we can. I am satisfied that the men who will be accredited by your Committee will be of such type, and will have such objects in view, as will fully entitle them to these courtesies.

I have just received a letter from Dr. Zetek, and I quote a paragraph which will be of interest to you:

"Through the kindness of Major Raycroft Walsh of the Air Service, I made an inspection yesterday of Barro Colorado Island from an aeroplane. It was a grand sight, and I am more enthusiastic than ever over our research station. What I saw yesterday assures me of the success of our scientific venture. This will be the center of biological research in the American Tropics."

About Mr. Johansen: He has taken hold well, and his work is proceeding satisfactorily, though of course time will be required to show substantial results.

With best wishes,

Very sincerely yours,

JAY J. MORROW
Governor.

Acked Jan 5/24

Figure 4. Letter (December 14, 1923) sent to Fairchild (as representative of the Institute for Research in Tropical America) by Panama Canal Zone governor J. Morrow. The letter indicates that Barro Colorado Island has been declared a reserve for biological research. Courtesy of Fairchild Tropical Botanic Garden.

DAVID FAIRCHILD'S ACTIVITIES

Itinerary

Unfortunately, Fairchild's (1924a) report does not specify the dates of his arrival and departure to and from Panama or his visits to particular sites. Therefore, we have used indirect evidence, such as the dates of his photographs, information found in his letters, and newspaper articles to make a timeline of his trip.

Fairchild arrived in Panama from Havana on board the *SS Cartago* (Fig. 6) sometime during the third week of July (Fairchild 1924a: 4). This ship was one of the "Great White Fleet" that was owned and operated by the United Fruit Company Steamship Service. Vessels belonging to this fleet not only transported passengers but also moved cargo between the U.S. and the Caribbean (Stephens 2023: 22–27). The *SS Cartago* anchored at the Santa Clara docks (Havana port) between July 8 and 10 before cruising to Panama, having come from New Orleans (*Diario de La Marina Edición de la Tarde* Year 92 (139): 3; *Diario de La Marina Edición de la Mañana* Year 92 (190): 13).

Regarding his return, Fairchild's (1924a: 1) account was written aboard the *SS Ulua* on August 16. This ship, also part of the Great White Fleet (Fig. 6), was reported in Havana on August 14 and 15 (*Diario de La Marina Edición de la Mañana* Year 92(225): 3; Year 92(226): 3, 11) en route to New York. Therefore, Fairchild wrote down his observations on his visit to Panama while sailing from Cuba to the U.S. Although we are uncertain of the date that the *SS Ulua* departed from the Caribbean port of Cristobal, evidence from the *Star and Herald* (Volume 25 (21017): 4) and the two letters sent to Lathrop (July 22: page 41; August 10: page 53), suggests that by August 11, Fairchild was already sailing back from Central America.

Despite the brevity of Fairchild's visit in Panama, he still was able to travel between the Caribbean and Pacific

Table 2. Internet resources available to the project, including online supplementary appendices.

Description	Website address	Notes
Online Supplementary Appendix 1	https://archive.org/details/fairchild-panama-1924-report/page/n11/mode/2up	Handwritten account produced by Fairchild regarding his 1924 visit to Panama[a]
Online Supplementary Appendix 2	https://archive.org/details/fairchild-panama-1924-photos	Photos made by Fairchild during his 1924 visit to Panama[a]
Online Supplementary Appendix 3	https://archive.org/details/star-herald-panama-fairchild-1924	*Star & Herald* newspaper (Panama): articles regarding his 1924 visit of Fairchild to Panama
Diario de La Marina	https://prensahistorica.mcu.es/es/publicaciones/ficha_pub.do?idPublicacion=1001922	*Diario de La Marina* newspaper (Havana)
US National Plant Germplasm System Database	https://npgsweb.ars-grin.gov/gringlobal/search?q=PI+98769	Database of germplasm introduced in the U.S. through the USDA
USDA Germplasm Inventory publications	https://www.ars.usda.gov/northeast-area/beltsville-md-barc/beltsville-agricultural-research-center/national-germplasm-resources-laboratory/docs/plant-inventory-books/	Pdf files with brief collection reports

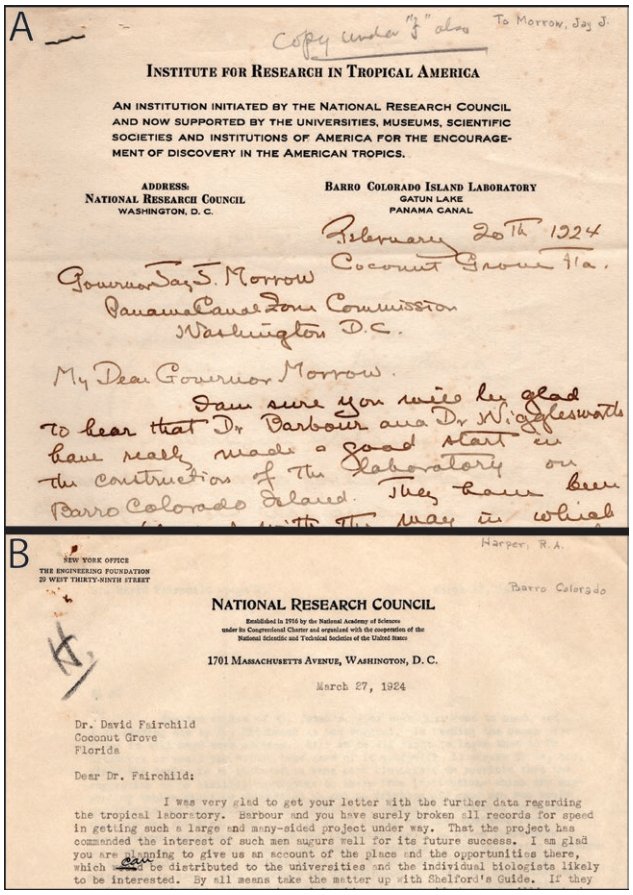
[a] Courtesy of Archives and Library of Fairchild Tropical Botanic Garden.

coasts visiting different sites (Fig. 7). These included the Summit Municipal Park (Fairchild 1924a: 2; thereafter the Summit Gardens)[2]. The second letter that Fairchild sent to Lathrop from Panama indicates that in this garden he met its director, Holger P. Johansen (Table 3), highlighting that among the plants encountered there were three accessions of fiberless mango (cultivars '*Alphonse*,' '*Amini*,' and '*Packria*') that were part of the germplasm collections Fairchild and Lathrop had gathered during their 1902 plant exploration trip to India (Pieters 1905: 196, 199, 200). Fairchild also visited (1) the Barro Colorado Island (BCI) Laboratory (currently known as the Smithsonian Tropical Research Institute Laboratories on BCI; Fairchild 1924a: 5; Fig. 2); (2) Balboa, where he and W. Wheeler (Table 3) delivered talks on mangosteen and ants, respectively (Online Supplementary Appendix 3; Fairchild 1924a: 3, 21); and (3) natural areas adjacent to Fort Sherman (photos 00548, 11794) or Marajal (Fairchild 1924a: 19–20). Furthermore, Fairchild went to Ancon to meet Governor Jay J. Morrow (Table 3), probably as a follow-up to correspondence they had exchanged before Fairchild's trip (Fairchild to Lathrop, July 22: 35). While in Ancon he also interacted with J. B. Shropshire, the chief sanitary inspector of the Panama Canal Zone (Table 3; letter of Fairchild to Lathrop, July 22: 36). Shropshire, an expert on local invertebrates, was known for assisting naturalists who visited the region (e.g., Dodds 1926; Curran 1930).

[2] See Elton et al. (2023) for details of the history of Summit Gardens. During Fairchild's visit they were known as the Canal Zone Plant Introduction Gardens; in 1929 they were renamed the Canal Zone Experimental Gardens. In 1985 the gardens were transferred to the Panama Municipality, and since then have been called Summit Municipal Park. Here we refer to them as Summit Gardens.

Trip participants and references to the previous 1921 visit

Alexander ("Sandy") Graham Bell Fairchild (Fig. 1, Table 3), David Fairchild's son, also joined this expedition (Fairchild 1924a: 4). Like his father, Graham was an avid naturalist, who later pursued his undergraduate and Ph.D. degrees at Harvard University. By 1938, he was working at the Gorgas Memorial Laboratory in Panama City, where he specialized in the study of horseflies (Tabanidae). In 1970 Graham retired from this institute and moved to the University of Florida, Gainesville, where he had an honorary appointment (Burger 1999). Frederick ("Freddie") Burgess (Fig. 1), a friend of Graham's, traveled with him and his father as well (Fairchild 1924a: 4); however, there is no further information on Burgess apart from references to his presence and help mentioned by Wheeler (1924, 1925). Interestingly, James Zetek (Fig. 1, Table 3), together with his wife and daughter, also cruised with the Fairchilds on the *SS Cartago* (Fairchild 1924a: 4). The vessel departed from New Orleans and made a layover in Cuba before its arrival in Panama, as indicated by *El Diario de la Marina* records (*Diario de La Marina Edición de la Tarde* Year 92 (139): 3; *Diario de La Marina Edición de la Mañana* Year 92 (190): 13). Zetek was the first director of the BCI Laboratory and a relevant figure in the establishment of this research facility (Sapp 2016).


A

Copy under "J" also To Morrow, Jay J.

INSTITUTE FOR RESEARCH IN TROPICAL AMERICA

AN INSTITUTION INITIATED BY THE NATIONAL RESEARCH COUNCIL AND NOW SUPPORTED BY THE UNIVERSITIES, MUSEUMS, SCIENTIFIC SOCIETIES AND INSTITUTIONS OF AMERICA FOR THE ENCOURAGEMENT OF DISCOVERY IN THE AMERICAN TROPICS.

ADDRESS: NATIONAL RESEARCH COUNCIL WASHINGTON, D. C.

BARRO COLORADO ISLAND LABORATORY GATUN LAKE PANAMA CANAL

February 20th 1924
Coconut Grove Fla.

Governor Jay J. Morrow
Panama Canal Zone Commission
Washington D.C.

My Dear Governor Morrow.

I am sure you will be glad to hear that Dr. Barbour and Dr. Wigglesworth have really made a good start on the construction of the laboratory on Barro Colorado Island. They have been [illegible] with the way in which

B

Harper, R.A.

NEW YORK OFFICE THE ENGINEERING FOUNDATION 29 WEST THIRTY-NINTH STREET

Barro Colorado

NATIONAL RESEARCH COUNCIL

Established in 1916 by the National Academy of Sciences under its Congressional Charter and organized with the cooperation of the National Scientific and Technical Societies of the United States

1701 MASSACHUSETTS AVENUE, WASHINGTON, D. C.

March 27, 1924

Dr. David Fairchild
Coconut Grove
Florida

Dear Dr. Fairchild:

I was very glad to get your letter with the further data regarding the tropical laboratory. Harbour and you have surely broken all records for speed in getting such a large and many-sided project under way. That the project has commanded the interest of such men augurs well for its future success. I am glad you are planning to give us an account of the place and the opportunities there, which [illegible] be distributed to the universities and the individual biologists likely to be interested. By all means take the matter up with Shelford's Guide. If they

Figure 5. Correspondence relevant to Fairchild's involvement in the establishment of the Barro Colorado Island Laboratory. (A) Letter (February 20, 1924) sent to Panama Canal Zone governor J. Morrow by Fairchild highlighting initial developments in this site, as well as the active involvement of herpetologist Thomas Barbour (1884–1946, director of the Museum of Comparative Zoology of Harvard University) and geologist Edward Wigglesworth (1885–1945, director of the Museum of the Boston Society of Natural History). (B) Letter (March 27, 1924) sent to Fairchild by botanist Robert A. Harper (1862–1946, Torrey Professor of Botany at Columbia University and chairperson of the National Research Council) discussing potential academic and research developments on this site. Courtesy of Fairchild Tropical Botanic Garden.

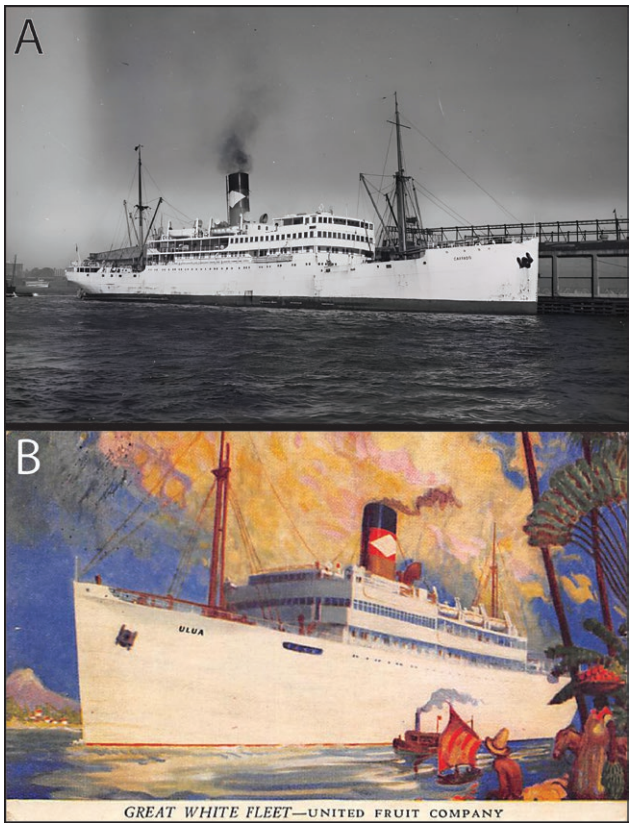


Figure 6. Vessels of the Great White Fleet, United Fruit Company Steamship Service, on which David Fairchild traveled to and from Panama in 1924. (A) *SS Cartago*: Fairchild took this ship on his outward voyage from New Orleans to Panama (Cristobal) in late July. Courtesy of the Mariners' Museum and Park, Newport News, Virginia, archive # P0001.003/01-#PB14455. (B) *SS Ulua*: Fairchild traveled on this ship for his return trip from Panama (Cristobal) to New York. Courtesy of Archives of Montgomery Botanical Center.

The first pages of Fairchild's (1924a: 1–2) report reference his earlier trip to Panama in 1921 (Fairchild 1921, 1922), during which he interacted with, among others, four individuals from the Canal Zone: J. H. K. Humphrey, Hugh White, Lewis Anthony Byrnes, and Alfred Friedrich Marti. Fairchild's (1924a: 1) report also refers to Palemon H. Dorsett (1862–1943), a field botanist of the USDA. Table 3 and Fig. 8 provide additional biographical details and photos of these individuals. The images presented in Fig. 8 were included in Fairchild's (1921) unpublished account of his 1921 voyage to Panama.

These initial pages of Fairchild's (1924a: 2–3) account also praise the botanical and ecological research being performed in the Canal Zone during this period. For the Summit Gardens he states: "Today I find a Plant Introduction Garden at Summit where $21,000 a year has been spent and which is better planned than many of our own gardens" (Fairchild 1924a: 2). Similarly, he expressed admiration for the progress made at the BCI Laboratory, addressing its transformation from a place with little botanical interest into a thriving center for plant studies (Fairchild 1924a: 3).

Barro Colorado Island Laboratory

Barro Colorado Island, located in Gatun Lake, formed when the Panama Canal was built, is an artificial island that is home to one of the most famous tropical

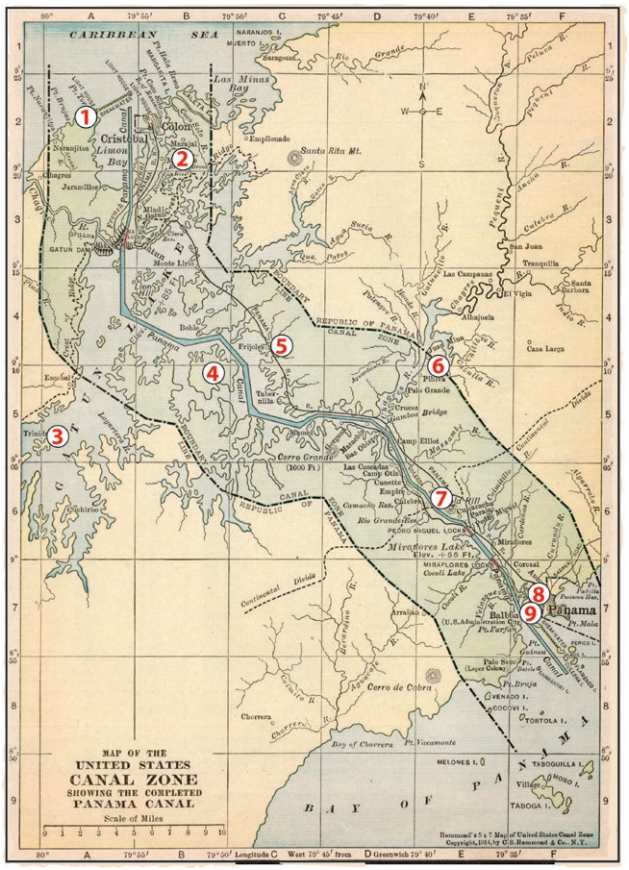


Figure 7. Sites Fairchild visited during his 1924 trip to Panama or that are mentioned in his trip report (Fairchild 1924a). Sites coded as 1. Fort Sherman and Clear Water River; 2. Marajal jungle; 3. *Isla Hormiga; 4. Barro Colorado Island; 5. *Frijoles; 6. *Juan Mina; 7. Summit Gardens; 8. Ancon; 9. Balboa. Asterisks refer to sites that were visited in 1921 and are mentioned in Fairchild's (1924a) report, but we are not certain if they were part of the 1924 itinerary. Map reproduced from *Hammond's Atlas of the World*. Year 1914. C.S. Hammond & Co. Publisher. Courtesy of Archives of Montgomery Botanical Center.

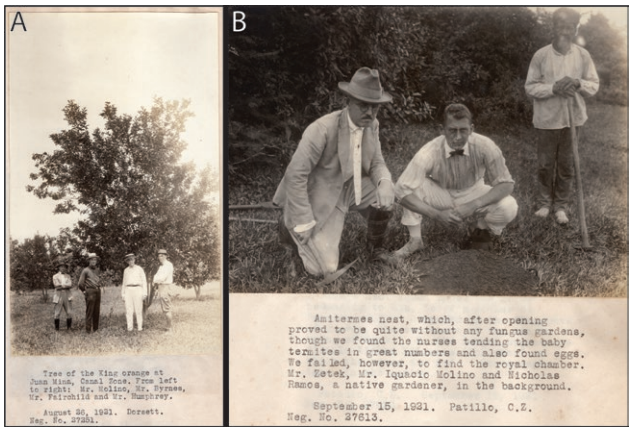


Figure 8. Individuals Fairchild met during his 1921 expedition to Panama who are mentioned in Fairchild's (1924a) report. Photos are included in the account Fairchild wrote for his 1921 trip to Panama. (A) From left to right: Ignacio Molino, Lewis Anthony Byrnes, David Fairchild, and J.H.K. Humphrey posing in Juan Mina (Fairchild 1921: 19). (B) From left to right: James Zetek, Ignacio Molino, and Nicolás Ramos posing at an unknown site in the Panama Canal Zone (Fairchild 1921: 106). Field assistant Nicolás Ramos is not mentioned in Fairchild's (1924a) report. Table 3 provides further details about individuals posing in these photographs. Courtesy of Fairchild Tropical Botanic Garden.

biology research stations and field laboratories worldwide (Leigh 2009; Raby 2015, 2015; Fig. 2). The first buildings of this station were opened on March 29, 1924 (Hagen 1990; Raby 2015), four months before Fairchild visited these laboratories for the first time. During this period, the site was administered by the Institute for Research in Tropical America, an entity sponsored by the National Research Council of the United States that was formed in 1916 (Raby 2017: 97; Wright 2020).

As stated on page 3 of his report, most of Fairchild's stay in Panama was spent on BCI. From information found with his photos, it is certain that he was stationed on this island between July 19 and 29. During this short period four other distinguished American naturalists also converged on the island: entomologists N. Banks and the aforementioned W. Wheeler and J. Zetek, and neurobiologist C. P. Richter (Fig. 1, Table 3). Their gathering was highlighted by the *Star & Herald* newspaper (Online Supplementary Appendix 3), probably as a collective initiative to promote BCI as a center for tropical biology research, given that the station had only recently opened.

Fairchild was one of the most relevant supporters and advocates for the creation of this field station (Fairchild 1924b; Hagen 1990; King 2001). As a "representative of the Institute for Research in Tropical America" he had an active involvement in planning and establishing the station's infrastructure (Figs. 4-5). The two letters he sent to Lathrop indicate that the latter provided funding for the laboratory's initial development. In recognition for this sponsorship, one of the first trails made on the island was named after him (Fig. 2), as noted in the letter Fairchild sent on August 10.

Terrestrial invertebrate accounts

Insect and spider observations were relevant components of Fairchild's encounters with the biota of this island. A total of 12 species of insects and 1 tarantula were recorded in his photos or handwritten report (Appendix 2). Notably, Fairchild was the only botanist staying on BCI, while the other naturalists were zoologists, most of them leading entomologists. Once on BCI,

Table 3. Personalities mentioned in Fairchild's (1924a) report, already known or met during the trip.

Name	Biographical note / Reference	Figure number in this paper / Fairchild Tropical Botanic Garden photo number	Page number in Fairchild's (1924a) report
Nathan Banks (1868–1953)	Entomologist from Harvard University / Carpenter & Darlington 1954	1 / 00079, 00053	5, 7
Alexander Graham Bell Fairchild (1906–1994)	Son of David Fairchild who eventually joined the Gorgas Memorial Laboratory, Panama City, as an entomologist in 1938 / Burger 1999	1 / 00078, 00079, 00540, 01537	4–5, 13–14
Theodor Boveri (1862–1915)[a]	German zoologist specialized in cytology and embryology / Maderspacher 2008	- / -	4
Frederick Burgess	Friend of Graham Bell Fairchild	1 / 00079, 01537	4–5, 13–14, 20
Lewis Anthony Byrnes (1884–1933)[a]	Supervisor for the Panama Canal Company / Anonymous without date; Fairchild 1921: 18, 19	8 / -	2
Palemon Howard Dorsett (1862–1943)[a]	Field botanist of the Section of Foreign Seed and Plant Introduction of the USDA / Anonymous 1932; Fairchild 1936	- / -	1
J. H. K. Humphrey[a]	Superintendent of the Cattle Industry Division, Cristobal, Panama / Fairchild 1921: 18	8 / -	1–2
Holger P. Johansen (1898–1935)	First curator of living collections at Summit Gardens / Anonymous 1939: 6; Elton et al. 2023	- / -	2–3
Alfred Friedrich (Fritz) Marti (? – 1956)[a]	Swiss native who was one of the canal employees / Anonymous 1956	- / -	1
Ignacio Molino	Panamanian lawyer who assisted James Zetek establishing the Barro Colorado Island laboratories / Anonymous 2024	1, 8 / -	4
Jay J. Morrow (1870–1937)[b]	Governor of the Panama Canal Zone between 1921 and 1924 / Anonymous 1937	- / -	-
Charles Wesley Powell (1854–1927)	Self-taught horticulturalist and orchid specialist, established the first large-scale collection of Panamanian orchids / Anonymous 1928	- / -	14
Curt P. Richter (1894–1988)	Neurobiologist from Johns Hopkins Medical School / Schulkin 2005	1 / -	5, 11, 14
J.B. Shropshire[c]	Chief Sanitary Inspector, U.S. Army, Panama Canal Zone / Barbour 1925	- / 12681	-
George C. Wheeler (1897-1991)	Entomologist from Syracuse University / Trager 1988	- / -	-
William M. Wheeler (1865–1937)	Entomologist from Harvard University / Carpenter 1938	1 / 00079, 00080, 00548	3–8, 11
Hugh White[a]	Unknown / Fairchild 1921: 103	- / -	1
James Zetek (1886–1959)	Entomologist who was one of the founders, and the first director of the Barro Colorado Island Laboratory until his retirement in 1956 / Snyder et al. 1959; Hagen 1990	1, 8 / 00548	4

[a] Individual mentioned in Fairchild (1924a) who did not participate in the 1924 visit of Fairchild to Panama.
[b] Individual mentioned in letter sent to Lathrop by Fairchild (July 22, page 35).
[c] Individual mentioned in letter sent to Lathrop by Fairchild (July 22, page 36).

Fairchild was influenced by their field research on this site. From his account, he was clearly attracted by the biology and ecology of the BCI terrestrial invertebrates, particularly of the fungus-growing ants belonging to the tribe Attini. He made photos or written accounts for 6 species belonging to this group of insects (Appendix 2). Early in his career, when he was working in Java (1896), Fairchild also showed an interest in nest-building insects that exhibit mutualism with fungi. At that time, he performed field studies on fungus-growing termites (subfamily Macrotermitinae). His findings are reported in his autobiography (Fairchild 1938: 66–70, 64D, 64E). On BCI, he also documented three other ant species (Appendix 2), including the notorious bullet-ant (*Paraponera clavata*), famous for its extremely painful bite, and the army ant (*Eciton hamatum*). He photographed a kelep ant (*Ectatomma tuberculatum*) nest, the stingless bee *Trigona* sp., and the antlike fly *Cardiacephala*

arthritica. Fairchild's interests in terrestrial arthropoda came not only from his termite observations in Java; ten years before this trip to Panama, he and his wife published a book with many photos of spiders (17 species), insects (92 species), myriapods (2 species), and crustaceans (1 species) captured with the Long Tom camera (Fairchild and Fairchild 1914). This work includes descriptive texts for the species that they depicted.

Interestingly, part of the entomological research conducted by Wheeler during this visit to BCI resulted in two papers he published upon his return to Harvard, both of which mention Fairchild (Wheeler 1924, 1925). One of these works concerns the army ant (*Eciton hamatum*) and aims to locate and describe the queen of these social insects (Wheeler 1925), while the other focuses on male courtship features of the antlike fly *Cardiacephala arthritica* (identified as *C. myrmex* by Wheeler). Fairchild (1924a: 7–8) also provides a detailed description of the mating behavior of the latter species. Such observations, coupled with the several discussions that Fairchild had with the other naturalists, led him to articulate several insights on aspects of life and human biology, found on pages 9–12 of his trip report. Regarding these philosophical writings, later, in 1948, in a margin note written in Nova Scotia, Canada, Fairchild stated: "This reflection on life is the best I ever wrote and now Sept 1, 1948—24 years after it was written, I read it with a feeling of wonder" (Fairchild 1924a: 9).

Fairchild's (1924: 1, 6) manuscript has reflections on race and society, including an anthropomorphic comparison between the behavior of fungus-growing ants, indicating that ant and fungi "live together as peacefully as the negroes do among us whites" (Fairchild 1924a: 6). Fairchild's views on the separation of races are well documented (Fairchild 1930: 272); those pertinent to eugenics have been discussed by Harris (2015: 158–159, 164), and more recently they were also highlighted by Watson (2024: 73) in a study on early twentieth century horticulture developments in Miami. Fairchild lived in a period in which racial segregation was the norm in the United States, and this historical and social setting influenced his thinking, as reflected in some of his writings.

Botanical accounts

In previous studies in which we have examined Fairchild's expedition reports, we have found that those documents focus primarily on botanical observations; however, his handwritten account of the 1924 trip to Panama emphasizes entomological observations, as well as the promotion of tropical biological research facilities. For instance, his descriptions of the plants found in the forest of BCI cover only four species, including (1) unidentified lianas forming what Fairchild called "aerial roots" (Fairchild 1924a: 12; photos 000535, 00553), (2) an unknown species of *Philodendron* that he misidentified as the Caribbean island endemic *P. lacerum* and that exhibited huge aerial roots (Fairchild 1924a: 12; photo 00540),[3] (3) an undetermined species of *Inga* that displayed extrafloral nectaries along its leaf rachis to attract ants as protection agents (Fairchild 1924a: 13; Photo 00554),[4] and (4) the functionally dioecious epi-

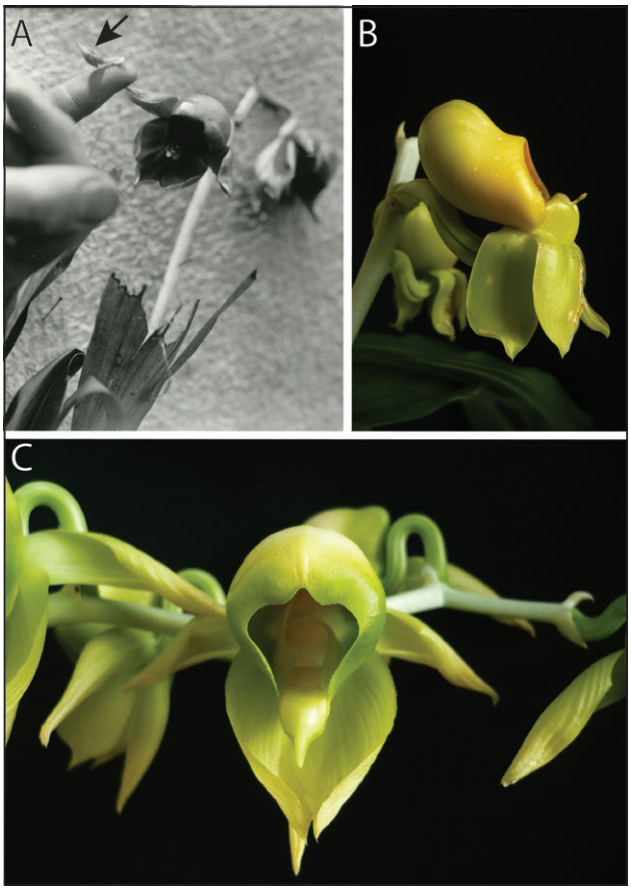


Figure 9. *Catasetum viridiflavum* Hook. (Orchidaceae). (A) Detail of an individual from Barro Colorado Island showing the pollinium (indicated with an arrow). Photo taken by David Fairchild during his 1924 trip to Panama (Photo 00664). Courtesy of Fairchild Tropical Botanic Garden. (B) Female flower, from a wild individual growing in Panama City. (C) Male flower, from wild individual growing in Panama City. (B) and (C): photos by Mabelin Santos.

[3] Tom Croat (Missouri Botanical Garden) has kindly pointed out to us that the only *Philodendron* on BCI with pinnately lobed leaves is *P. radiatum* Schott. We follow this taxonomic interpretation here.

[4] Terry Pennington (Royal Botanic Gardens, Kew) has kindly indicated that the depicted individual "has an unusual combination of features—the apparently large and round nectaries with one located at the base

Figure 10. *Manicaria saccifera* Gaertn. (Arecaceae) in habitat. (A) In Fort Sherman, Graham B. Fairchild (left) and Frederick Burgess (right) posing. Photo taken by David Fairchild during his 1924 trip to Panama (Photo 01537). Courtesy of Fairchild Tropical Botanic Garden. (B) In Damani-Guariviara Wetlands, Panama. Photo by A. Ibáñez.

phytic orchid *Catasetum viridiflavum* (Fig. 9), which, he noticed, throws its pollinia large distances when touched (Fairchild 1924a: 14; Photo 00664). This pollination mechanism ensures that the plant's single pollinator, *Eulaema cingulata* (Euglossini, Apidae), can move effectively among pollen to female flowers (Murren 2003).

Other plant species encountered in the Canal Zone are briefly mentioned, including mangos, bamboos, and *Senna siamea* trees in Summit Gardens (Fairchild 1924a: 2). The archival record identified 3 plant species that are not mentioned in his report but found in photographs, including *Manicaria saccifera* (photos 01537, 12681) from Fort Sherman (Fig. 10), plants of *Vachellia melanoceras* (Fig. 11) from Marajal (photos 00548, 11794), and the trunk of a *Hura crepitans* (Fig. 12) tree damaged by termites (Photo 00965). Finally, there are five photos (numbers 12321, 12322, 12325, 12326, 12328) of *V. melanoceras* for which there are no details on where they were taken.

Fairchild transported a total of 28 living plant collections (27 species) back to the U.S. aboard the *SS Ulua* (Fairchild 1924a: 19–21). Twenty-three of these collections (20 species) are reported as from Panama (Appendix 3). Interestingly, 5 of the transported accessions (for 5 species) are stated to have Cuban provenance, although Fairchild's report does not explain how they were acquired. We cannot rule out that these plants may have been loaded in Havana on August 14 (*Diario de La Marina Edición de la Mañana* Year 92 (225): 3; Year 92 (226): 3, 11) as Fairchild was sailing from Havana to

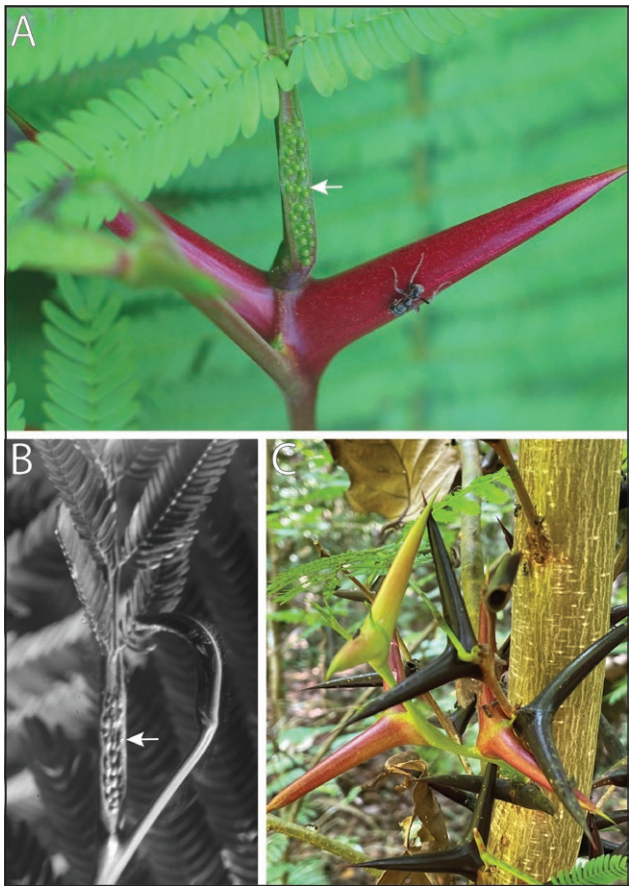


Figure 11. *Vachellia melanoceras* (Beurl.) Seigler & Ebinger. (Fabaceae). (A) Leaf petiole and basal spines, in habitat in San Lorenzo National Park, Panama. Nectaries are indicated with a white arrow. (B) Detail of leaf petiole showing leaf nectaries (indicated with an arrow). Photo taken by David Fairchild during his 1924 trip to Panama (Photo 12321), from an unknown locality. Courtesy of Fairchild Tropical Botanic Garden. (C) Detail of trunk showing its large spines, in habitat in San Lorenzo National Park, Panama. (A) and (C): photos by Sabrina Amador.

New York. A second possibility is that these plants were initially transported from Cuba to Panama on board the *SS Cartago* when Fairchild made his trip from the U.S. to Panama in 1924. Previous research (Montes Espín et al. 2021) has shown that Fairchild facilitated moving plant material from Cuba to Panama (mostly to Summit Gardens) during his expeditions; therefore, a third explanation would be that these Cuban plants had already been propagated in Panama when he arrived in the Canal Zone in late July. Fairchild's plans were for the plants carried aboard the *SS Ulua* to be propagated in the USDA station at Chapman Field, Miami, as indicated on page 47A (verso) of the August 10 letter that he sent to Lathrop. According to the USDA inventory reports,

of the petiole and the thick hairy leaflets and unwinged rachis" make it difficult to provide a taxonomic identification for this particular plant.

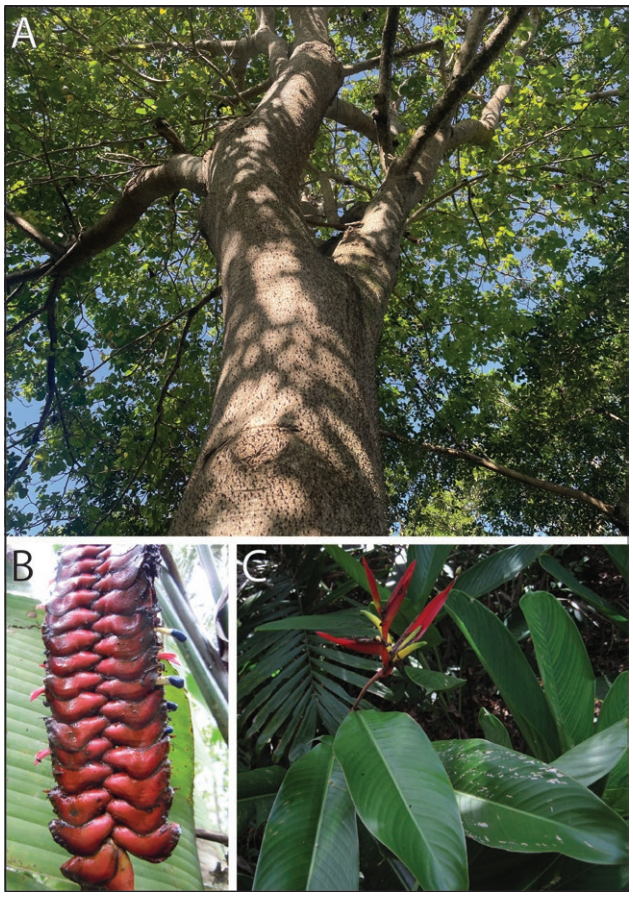


Figure 12. Images of plant species encountered by Fairchild during his 1924 trip to Panama. (A) *Hura crepitans* L. (Euphorbiacee), cultivated in Fairchild Tropical Botanic Garden. (B) *Heliconia mariae* Hook.f. (Heliconiaceae), in habitat in Soberanía National Park, Panama. (C) *H. vaginalis* Benth., in habitat in San Lorenzo National Park, Panama. (A) Photo by J. Francisco-Ortega. (B) Photo by Mark Fishbein. (C) Photo by A. Ibáñez.

Figure 13. Two of the legume species encountered by Fairchild during his 1924 trip to Panama. (A) *Cojoba rufescens*, specimen collected in habitat in Chiriquí, Panama. (B) *Prioria copaifera*, in habitat in Barro Colorado Island. Photos by Ricardo Brenes.

none of these accessions were ever recorded as being part of the germplasm collections of this federal agency (Appendix 3), except for those of *Garcinia humilis* (USDA accession number 61631) and *Manicaria saccifera* (USDA accession number 61629). The USDA records indicate that samples from five species [i.e., *Chamaedorea* sp., *Citrus* × *aurantifolia*, *Cojoba rufescens* (Fig. 13), *Elaeis guineensis*, and *Prioria copaifera* (Fig. 13)] that were not reported as transported by Fairchild as he traveled from Cristobal to New York were sent to the USDA by him, and they eventually reached the USDA germplasm collections (Appendix 3).

The collected plants were placed inside zinc propagation boxes (page 54A verso in August 19 letter of Fairchild to Lathrop), and we are not certain if Wardian cases were used during this trip. Pages 15–19 of Fairchild's (1924a) account are devoted to how to overcome the many technical difficulties of transporting living material inside different types of containers, particularly as they must be placed on ship decks. Twelve different items/recommendations, pertinent to his experience with this transportation practice, are listed and marked in this report. Two of Fairchild's previous works (Fig. 14) had already stressed how important it is to properly transport living material during plant-collecting endeavors, particularly when Wardian cases are used (Fairchild 1913, 1921: 1). This part of Fairchild's report highlights the challenges of plant-hunting trips during this period, as specimens had to be transported from the tropics to germplasm repositories in the temperate countries via long maritime journeys. These voyages took place on vessels that lacked specialized facilities for transporting living plant material. Interestingly, undergraduate research by Camas et al. (2020) shows that Fairchild also sometimes shipped the collected germplasm through air-freight services while he was travelling and exploring. This was the case during his 1932 expedition to the Caribbean Islands (Dorsett 1936).

Appendix 3 provides a taxonomic index of the plants that were encountered during the 1924 trip. Their biogeography and use by humans show that only eight of the species are native to the region (*Chamaedorea* sp., *Cojoba rufescens*, *Heliconia vaginalis*, *Hura crepitans*, *Manicaria saccifera*, *Philodendron* sp., *Prioria copaifera*, and *Vachellia melanoceras*), and were apparently encountered in their habitat; the rest of the species are from the Old World or other regions of the Americas.

Fairchild was a promoter of science education, and he wrote many popular botanical articles, mainly for *National Geographic* magazine (e.g., Fairchild 1922). He pioneered documentary filmmaking during his expeditions (Francisco-Ortega et al. 2020). As indicated

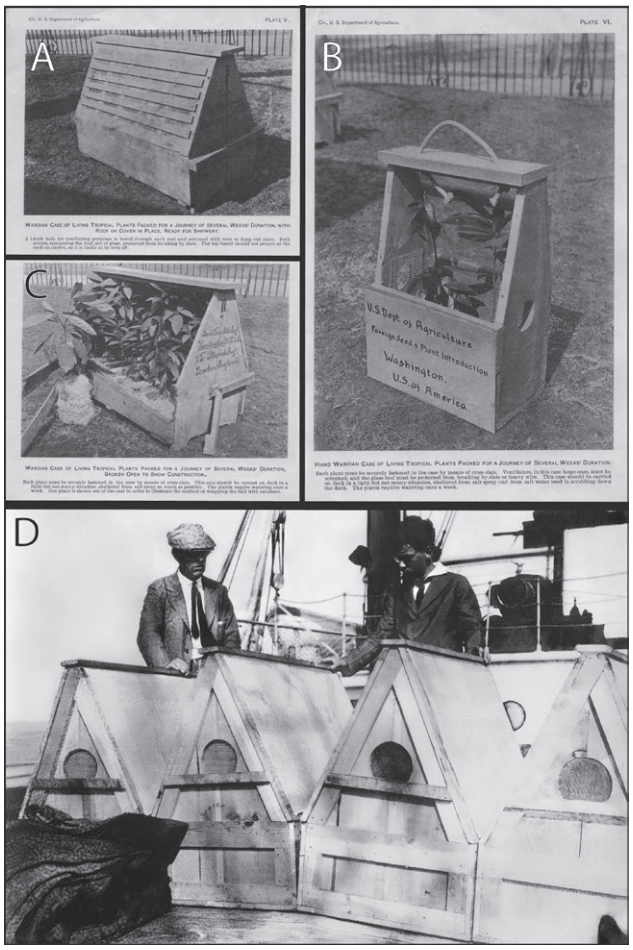


Figure 14. Wardian cases used by Fairchild during his plant-hunting expeditions. (A)–(C) As published in Fairchild (1913). Courtesy of the University of Illinois at Urbana-Champaign Library. (B) As published by Fairchild (1921: 1). Courtesy of Fairchild Tropical Botanic Garden.

above, in Panama (at the Community House of Balboa) he delivered a popular talk on mangosteens for which he used "lantern slides" (Fairchild 1924a: 3; *Star & Herald* 25(21017): 4; August 8, 1924; Online Supplementary Appendix 3). Furthermore, the same year he visited BCI he published a popular article highlighting the value of the island's habitats and field research facilities for studying neotropical biology (Fairchild 1924b).

Previous studies on Fairchid's legacy (e.g., Pauly 2007, Harris 2015, Stone 2018) have primarily highlighted his achievements as a plant collector, advocate for economic botany, and supporter for plant genetic resource research. Our study of Fairchild's unpublished account of the brief visit that he made to Panama in 1924 documents that he also was a well-rounded naturalist and supporter of tropical biology research. Clearly, in the early development of the BCI research laboratory, he played a key role in its emergence as a leading center for biological studies in the tropics.

ACKNOWLEDGMENTS

This paper pays homage to the trajectory of the Barro Colorado Island Laboratory, Smithsonian Tropical Research Institute, in promoting tropical biology research. We join other naturalists to celebrate its recent 100th anniversary (Fig. 2). Valeria Morey was supported by an FIU Kimberly Green Latin American and Caribbean Center–Global Learning Medallion Research Fellowship made possible by the center's U.S. Department of Education National Resource Center Grant. Javier Francisco-Ortega thanks support from Montgomery Botanical Center to conduct summer research. Andrés Delgado helped with the layout of photographs. Edgardo Civallero guided us with protocols to reproduce documents housed in the Smithsonian Institution; and Linette D. Dutari and Milton Solano helped us to locate some of these documents. Galey Williams provided guidance to locate relevant newspapers. Tom Croat helped with questions on the flora of BCI. Jeffrey Wells and Amy Zanne helped with initial questions on termite taxonomy. We are grateful to the following colleagues, who graciously shared with us details and bibliography on biogeography and taxonomy of some of the species encountered in on our research, Stephany Arizala (*Sericopelma*), Carla Black (*Heliconia vaginalis*), Ron Liesner, Terry Pennington (*Inga*), Monica Moraes (*Garcinia humilis*), and Gustavo Romero (*Catasetum viridiflavum*). Brett Jestrow kindly facilitated the study of documents and photos housed in ALFTBG, and located relevant species grown in the FTBG living collections, as well as identifying mango cultivars. Clyde Stephens helped with insights pertinent to the history of the United Fruit Company Steamship Service. The following individuals kindly provided plant photos shown in this contribution: Sabrina Amador (*Vachellia melanoceras*), Ricardo Breenes (*Cojoba rufescens*, *Prioria copaifera*), Mark Fishbein (*Heliconia mariae*), and Mabelin Santos (*Catasetum viridiflavum*). Thanks to the Centro Studi Erbario Tropicale (Herbarium FT) of the University of Florence (Italy) for sponsoring the publication and Riccardo M. Baldini (Editor in Chief of Webbia).

REFERENCES

Agouillal F, Taher, ZM, Moghrani, H, Nasrallah N, Enshasy HE. 2017. A review of genetic taxonomy,

biomolecules chemistry and bioactivities of *Citrus hystrix* DC. Biosciences Biotechnology Research Asia. 14: 285–305.

Andrés-Agustín J, Cruz-Castillo JG, Bautista-Villegas JC. 2021. *Garcinia intermedia*, a little-known fruit tree in the American tropics. Revista Chapingo Serie Horticultura. 28: 5–15.

Anonymous. Without date. Lewis Anthony Byrnes (available online at: https://www.findagrave.com/memorial/19425981/lewis-anthony-byrnes).

Anonymous. 1928. Charles W. Powell. Missouri Botanical Garden Bulletin. 16: 53–58.

Anonymous. 1932. Effect of the government economy measure on scientific experts. Science. 76(1958): 8.

Anonymous. 1937. Ex-Pittsburgh diplomat dies. Brig.-Gen. J.J. Morrow, 67, had kin here. The Pittsburgh Press. 53(296) – April 18, 1937: 20.

Anonymous. 1939. A tribute to the late Holger P. Johansen. Annual Reports of the Canal Zone Experiment Gardens. Fiscal years 1935 and 1936: 6.

Anonymous. 1956. The curtain falls. Canal Record. September 1956: 2–18.

Anonymous. 2024. A Group of Naturalists at Barro Colorado Island, Panama. 1924. Barro Colorado Island: 100 Years of Discoveries and Wonder (available online at: https://striresearch.si.edu/barrocolorado100/naturalists/).

Barbour T. 1925. Report of the Canal Zone Biological Area. 1925-1940. Issue 01. Year 1925 [Transcribed and edited by E. Civallero]. STRI Library & Archive, Panama. (available online at: https://striresearch.si.edu/library/wp-content/uploads/sites/211/2024/09/Report-01-1925.pdf).

Borges Ferro G. 2019. Systematics of the Tribe Taeniapterini (Diptera: Micropezidae, Taeniapterinae) with a Review of the genus *Paragrallomyia* Hendel. Unpublished Doctoral Dissertation, University of Guelph, Guelph, Canada.

Burger JF. 1999. Alexander Graham Bell ("Sandy") Fairchild: A biography. Memoirs of Entomology International. 14: 1–41.

Burgos-Soler C., Pérez Farrera, MA, Naranjo A, Francisco-Ortega J. In press. David Fairchild as the President Emeritus of Fairchild Tropical Botanic Garden: the 1944 expedition to Mesoamerica. Huntia.

Calderón de Rzedowski G. 2009. Heliconiaceae. Flora del Bajío y Regiones Adyacentes. 61: 1–5.

Camas M, Carrington CMS, Saint-Aime S, and Francisco-Ortega J. 2020. David Fairchild's plant-hunting expedition in the Lesser Antilles: year 1932. Selbyana. 33: 43-62

Carpenter FM. 1938. William Morton Wheeler. Isis. 28: 421–423.

Carpenter FM, Darlington PJ. 1954. Nathan Banks. Isis. 61: 81–110.

Civallero E. 2024. Donde habitan las alabras. Exposiciones. Una estancia en la Isla de Barro Colorado en 1924: "Es muy emocionante". Un póster presentado en BCI 100. Biblioteca y Archivo de STRI, Panama (available online at: https://striresearch.si.edu/library/exposiciones/barro-colorado-1924/).

Copete JC, Mosquera Flórez D, Núñez-Avellaneda LA. 2018. Pollination ecology of *Manicaria excelsa* (Arecaceae). In: Mokwala PW (ed.), Pollination in Plants. IntechOpen, London. Pp. 23–37.

Croat TB. 1978. Flora of Barro Colorado Island. Stanford University Press, Stanford.

Curran CH. 1930. New species of Diptera belonging to the genus *Baccha* Fabricius (Syrphidie). American Museum Novitates. 403: 1–16.

Do TVT, Fan L, Suhartini W, Girmatsion M. 2019. Gac (*Momordica cochinchinensis* Spreng) fruit: a functional food and medicinal resource. Journal of Functional Foods. 62: 103512.

Dodds GS. 1926. *Entomostraca* from the Panama Canal Zone with description of one new species. Occasional Papers of the Museum of Zoology. University of Michigan. 174: 1–27.

Dorsett PH. 1936. Allison V. Armour Agricultural Expedition for the U.S. Department of Agriculture with the Yacht Utowana, visiting islands of the British West Indies and British and Dutch Guiana, Nov. 1931–Apr. 1932. Unpublished report accessioned at US National Archives, College Park, MD. Depository: volumes 74 and 75 of Expedition Reports of the Office of Foreign Seed and Plant Introduction of the Department of Agriculture 1900–1938. Report completed on February 11, 1936 (available online at: https://archive.org/details/dorsett-travelogue-1931-1932-usda-caribbean-expedition-vol-1-pp.-1-452/mode/2up).

Douglas MS. 1973. Adventures in a Green World: the Story of David Fairchild and Barbour Lathrop. Field Research Projects, Miami.

Elton C, Francisco-Ortega J, Ibáñez A. 2024. A stay on Barro Colorado Island in 1924: "It´s too exciting." Poster Displayed at the "Barro Colorado Island 100 Years" symposium. June 16–20, 2024, Smithsonian Institution, Gamboa, Panama (https://striresearch.si.edu/bci100-symposium/). Unpublished (available online at: https://archive.org/details/poster-fairchild-1924-panama-bci-2024-symposium).

Elton C, Ibáñez A, Akers M, Ventocilla J. 2023. Guide to Summit Park. 100 years of connection with nature. Alcaldía de Panamá, Panama City.

Fairchild D. Without date. List of Inventory Numbers of Section of Seed and Plant Introduction which Refers to Seeds and Plants Secured by Lathrop and Fairchild [unpublished report accessioned at the Archives and Library of Fairchild Tropical Botanic Garden].

Fairchild D. 1913. How to Send Living Plant Material to America. U.S. Government Printing Office, Washington, DC.

Fairchild D. 1921. Panama Trip. August 17th to September 29th, 1921 [unpublished manuscript accessioned at the Archives and Library of Fairchild Tropical Botanic Garden].

Fairchild D. 1922. The jungles of Panama. The National Geographic Magazine. 41: 131–145.

Fairchild D. 1924a. Field book of David Fairchild. Begun on the High Seas en Route Panama to New York, August 16th 1924. Closed in Utrecht, Holland, November 6th 1924 [unpublished manuscript accessed at the Archives and Library of Fairchild Tropical Botanic Garden].

Fairchild D. 1924b. Barro Colorado Island laboratory. Journal of Heredity. 15: 99–112.

Fairchild D. 1927. The pink fleshed pummelo of Java. Journal of Heredity. 18: 425–427.

Fairchild D. 1928. Two expeditions after living plants. The Scientific Monthly. 26: 97–127.

Fairchild D. 1930. Exploring for Plants. From Notes of the Allison Vincent Armour Expeditions for the United States Department of Agriculture, 1925, 1926, and 1927. Charles Scribner's Sons, New York.

Fairchild D. 1936. Award of Meyer Medal to P.H. Dorsett. Journal of Heredity. 27: 307–310.

Fairchild D. 1938. The World was my Garden. Travels of a Plant Explorer. Charles Scribner's Sons, New York.

Fairchild D, Fairchild M. 1914. Book of Monsters. National Geographic Society, Washington, DC.

Francisco-Ortega J, Swan M, Bennett BC, Jestrow B. 2020. Early use of motion pictures in economic botany (1924, 1926): China, Indonesia, and Sri Lanka. Economic Botany. 74: 363–371.

Greuter W, Rankin Rodríguez R. 2022. Plantas Vasculares de Cuba. Inventario, ed. 3. Botanischer Garten und Botanisches Museum, Berlin and Jardín Botánico Nacional, Universidad de La Habana, Havana.

Hagen JB. 1990. Problems in the institutionalization of Tropical biology: the case of the Barro Colorado Island Biological Laboratory. History and Philosophy of the Life Sciences. 12: 225–247.

Harris A. 2015. Fruits of Eden: David Fairchild and America's Plant Hunters. University of Florida Press, Gainesville.

Hodge WH, Erlanson CO. 1956. Federal plant introduction: a review. Economic Botany. 10: 299–334.

Hughes CE, Ringelberg JJ, Lewis GP, Catalano SA. 2022. Disintegration of the genus *Prosopis* L. (Leguminosae, Caesalpinioideae, mimosoid clade). PhytoKeys. 205: 147–189.

Jagtap UB, Bapat VA. 2010. *Artocarpus*: a review of its traditional uses, phytochemistry and pharmacology. Journal of Ethnopharmacology. 129: 142–166.

Jørgensen PM, Harley M, Beck SG. Eds. 2014. Catálogo de la plantas vasculares de Bolivia. Monographs in Systematic Botany from the Missouri Botanical Garden. 127: 1–1744.

Kempf WW. 1964. A revision of the Neotropical fungus-growing ants of the genus *Cyphomyrmex* Mayr. Part 1: Group of *strigatus* Mayr (Hym., Formicidae). Studia Entomologica. 7: 1–44.

Keogh L. 2020. The Wardian Case: How a Simple Box Moved Plants and Changed the World. University of Chicago Press, Chicago.

King E. 2002. Introducción a la historia de la isla Barro Colorado. In: Heckadon-Moreno S (ed.), Panamá: Puente Biológico. Instituto Smithsonian de Investigaciones Tropicales, Balboa, Ancón, Panama. Pp. 63–68.

Koptur S. 1994. Floral and extrafloral nectars of Costa Rican inga trees. Biotropica. 26: 276–284.

Korber N, Nassar JM, Mosely J, Jestrow B, Lewis C, Francisco-Ortega J. 2016. The last plant hunting expedition of David Fairchild: Venezuela and Colombia (March–April 1948). Brittonia. 68: 170–186.

Kress WJ. 1984. Systematics of Central American *Heliconia* (Heliconiaceae) with pendent inflorescences. Journal of the Arnold Arboretum. 65: 429–532.

Kress WJ. 2001. Heliconiaceae Nakai. In: Stevens, WD, Ulloa Ulloa C, Pool A, Montiel OM (eds.), Flora de Nicaragua. Angiospermas (Fabaceae–Oxalidaceae). Monographs in Systematic Botany from the Missouri Botanical Garden 85(2). Missouri Botanical Garden Press, St. Louis. Pp. 1132–1139

Kress WJ., Betancur J, Echeverry B. 2004. Heliconias. Llamaradas de la Selva Colombiana. Guía de Campo. Edition 2. Cristina Uribe Editores, Bogota.

Kumar D, Jain A., A. Verma A. 2017. Phytochemical and pharmacological investigation of *Cassia siame*a Lamk: an insight. The Natural Products Journal. 7: 255–266.

Leigh EG. 2009. Barro Colorado. In: Gillespie GR, Clague DA (eds.), Encyclopedia of Islands. University of California Press, Berkeley and Los Angeles. Pp. 88–91.

Lisio E, Ibánez A, Elton C, Pérez Farrera MA, Francisco-Ortega J. 2024. Voyages of David Fairchild to Guatemala and Panama: an overview and the 1941 expe-

dition. Journal of the Botanical Research Institute of Texas 18: 369–388.

Longino JT. 2010. A taxonomic review of the ant genus Megalomyrmex Forel (Hymenoptera: Formicidae) in Central America. Zootaxa. 2720: 35–58.

Maderspacher F. 2008. Theodor Boveri and the natural experiment. Current Biology. 18(7): R279-86.

McKee R. 1927. Seeds and plants imported by the Office of Foreign Plant Introduction, Bureau of Plant Industry, during the period from July 1 to September 30, 1924 (S.P. I. Nos. 60957 to 61737). United States Department of Agriculture. Inventory. 80: 1–34.

Mitchell JD, Daly DC. 2015. A revision of *Spondias* L. (Anacardiaceae) in the Neotropics. PhytoKeys. 55: 1–92.

Montes Espín R, Fernández-Santana I, Lucía A, Ramos V, Vasallo Rodríguez L, Lima Cruz MA, Francisco-Ortega J. 2021. The expeditions of the research yacht *Utowana* and the building of the plant living collections of the oldest botanical garden of Cuba. Webbia. 76: 143–166.

Mosely J. 2012. David Fairchild and the world within the microscope. The Tropical Garden. 67(2): 64.

Murren CJ. 2003. Spatial and demographic population genetic structure in *Catasetum viridiflavum* across a human-disturbed habitat. Journal of Evolutionary Biology. 16: 333–342.

Ngernsaengsaruay C, Chanton P, Chaiprasongsuk M, Leksungnoen N. 2023. A taxonomic revision of *Garcinia* section *Xanthochymus* (Clusiaceae) in Thailand. PeerJ. 11: e16572.

Oldfield S. 2020. *Dillenia indica*. The IUCN Red List of Threatened Species 2020: e.T61994577A61994579.

Pauly PJ. 2007. Fruits and Plains: the Horticultural Transformation of America. Harvard University Press, Cambridge.

Pennington TD. 1990. Sapotaceae. Flora Neotropica Monographs. 52: 1–770.

Pérez R, Condit R, Lao S. 1999. Distribución, mortalidad y asociación con plantas, de nidos de *Paraponera clavata* (Hymenoptera: Formicidae) en la isla de Barro Colorado, Panamá. Revista de Biología Tropical. 47: 697–709.

Pieters AJ. 1905. Seeds and plants imported during the period from September, 1900, to December, 1903. Nos. 5501–9896. United States Department of Agriculture. Inventory. 10: 1–333.

Raby M. 2015. Ark and archive: making a place for long-term research on Barro Colorado Island, Panama. Isis. 104: 798–824.

Raby M. 2017. American Tropics: the Caribbean Roots of Biodiversity Science. University of North Carolina Press, Chapel Hill.

Rangel Marquina S, Uzcátegui Varela JP, Dávila Zambrano K, Briceño Rangel A, Ceballos Ramírez M, Mercado Marquez JA. 2016. Colección ex situ de plantas vivas de especies nativas del orden Zingiberales del sur del Lago de Maracaibo, Venezuela. Cuadernos de Biodiversidad. 50: 1–7.

Read RW. 2001. *Manicaria* Gaertn. In: Stevens, WD, Ulloa Ulloa C, Pool A, Montiel OM (eds.), Flora de Nicaragua. Introducción. Gimnospermas y angiospermas (Acanthaceae–Euphorbiaceae). Monographs in Systematic Botany from the Missouri Botanical Garden 85(1). Missouri Botanical Garden Press, St. Louis. P. 128

Roubik DW. In press. Working with Neotropical *Trigona* on Barro Colorado Island, Panama (Apinae: Meliponini). In: Wright J (ed.), 100 Years of Studies on Barro Colorado Island. Smithsonian, Washington, DC.

Sapp J. 2016. Coexistence: the ecology and evolution of tropical biodiversity. Oxford University Press, New York.

Schulkin J. 2005. Curt Richter. A Life in the Laboratory. The Johns Hopkins University Press, Baltimore and London.

Seigler DS, Ebinger JE. 1995. Taxonomic revision of the ant-acacias (Fabaceae, Mimosoideae, *Acacia*, series *Gummiferae*) of the New World. Annals of the Missouri Botanical Garden. 82: 117–138.

Snyder TE, Wetmore A, Porter BA. 1959. James Zetek, 1886–1959. Journal of Economic Entomology. 52: 1230–1232.

Stephens CS. 2023. Banana Man. Peeling and Revealing Life in the Tropics [edited by K. Huff]. Cecropia Press.

Stone D. 2018. The Food Explorer. The True Adventures of the Globe-trotting Botanist who Transformed what Americans Eats. Dutton, New York.

Tasker G. 2014. A centennial celebration of monsters. The Tropical Garden. 69(2): 42–44.

Tome AC, Teixeira Mársico E, Alves da Silva F,·Kato L,·Pimenta do Nascimento T, Guerra Monteiro ML. 2019. Achachairú (*Garcinia humilis*): chemical characterization, antioxidant activity and mineral profile. Journal of Food Measurement and Characterization. 13: 213–221.

Topete-Corona C, Cuevas-Guzmán E, Sánchez-Rodríguez EV, Moreno-Hernández A, Morales-Arias JG, Núñez-López NM. 2020. Estructura poblacional y hábitat de un árbol tropical con frutos comestibles, *Annona purpurea* (Annonaceae), en el occidente de México. Revista de Biología Tropical. 68: 1171–1184.

Ward PS, Branstetter MG. 2017. The acacia ants revisited: convergent evolution and biogeographic context

in an iconic ant/plant mutualism. Proceedings of the Royal Society B: Biological Sciences. 284: 20162569.
Watson T. 2024. Plant infrastructure, mangoes, race, and empire in early twentieth-century Miami. Environmental Humanities. 16: 58–78.
Wheeler WM. 1924. Courtship of the calobatas: the kelep ant and the courtship of its mimic, *Cardiacephala myrmex*. Journal of Heredity. 15: 485–495
Wheeler WM. 1925. The finding of the queen of the army ant *Eciton hamatum fabricius*. Biological Bulletin. 59: 139–149.
Wright SJ. 2020. The Smithsonian Tropical Research Institute: a century of ecological and applied research. Biological Conservation. 252: 108858.

APPENDIX 1

Transcript of Fairchild's (1924a) handwritten report pertinent to his 1924 voyage to Panama. Facsimile of this document is presented in Online Supplementary Appendix 1.

[Cover page]
FIELD BOOK of David Fairchild. Begun on the high seas en route Panama to New York August 16th 1924. Closed in Utrecht Holland November 6th 1924
"Vol I" in "Index" at close of volume

[Page 1]
1924 August 16th Saturday
S.S. ULUA[5]
of United Fruit Co Line

Before the remarkable impressions of the visit to Panama fade, I want to jot some of them down. Even though I was so tired after each day of excitement that I couldn't do much with writing at the time.

I could hardly believe that the Sum[6] was the same place Horticulturally as the place which Dorsett[7] and I visited 3 years ago.[8] Let me draw the comparison.

Three years ago we landed with our Wardian cases,[9] were met by the cattle man Mr. Humphrey[10] who sent one case to a miserable place in Colon watched over by a colored man who had a collection of straw hats and who knew or cared nothing about plants. We went to Juan Mina[11] a neglected place also under negro management or rather mismanagement and we stayed in Marti's[12] house at Gamboa. There were no grafted avocado or mango trees in the Zone and I took off my coat and put in buds into private seedlings there in several people's back yards. White's[13] and Wilson's[14] for example

[Page 2]
and together with Humphrey + Burees[15] put in some buds at Frijoles.[16] Today I find a Plant Introduction Garden at Summit[17] where $21,000 a year has been spent and which is better planned than many of our own gardens. A dripless lath house full of plants. A propagating box in action. Large nurseries of successfully grafted mango + budded mango seedlings from which will be distributed thousands of fiberless mangos and good varieties of avocados. I find a very intelligent man in charge, Johansen,[18] and his assistants who have been well trained.
I find the specimen trees on all the driveways labeled as in no other place I have visited in the Tropics and I find an awakened interest in plants which I never suspected could be built up so quickly in Panama.
To all this is added the growth of all the trees into shady

[5] Postcard of the *SS Ulua* is shown in Fig. 6. The vessel belonged to the United Fruit Company Steamship Service, also known as the Great White Fleet, a company that was composed of ships that transported cargo and passengers mostly between the United States and the Caribbean, but that also reached Central and South America. Based on information found in the *Diario de La Marina* (morning edition 92 (225): 3, 1924), the *SS Ulua* made one call at Havana on August 14, 1924. Therefore, this handwritten report was prepared when Fairchild was cruising from Havana to New York.
[6] Abbreviation for Summit Gardens.
[7] USDA plant explorer Palemon Howard Dorsett (1862–1943), one of the most famous field botanists of the Section of Foreign Seed and Plant Introduction of the USDA. This federal organization was founded by David Fairchild in 1898 (Hodge and Erlanson 1956). Dorsett retired in 1932 (Anonymous 1932), and received the Frank N. Meyer Medal in 1936 (Fairchild 1936).
[8] A trip that Fairchild and his son, Alexander Graham Bell Fairchild (1906–1994), made with Dorsett to Panama in 1921 (Lisio et al. 2024).
[9] This is the name given among horticulturists to the containers that were commonly used to transport living plants, mostly on ships (Keogh, 2020; Fig. 14).
[10] J. H. K. Humphrey (Fig. 8) was the superintendent of the Panama Canal Zone Cattle Industry Division, Cristobal (Fairchild 1921: 18).
[11] Juan Mina is a site located on the bank of the Chagres River.
[12] Alfred Friedrich (Fritz) Marti (?–1956), from Switzerland, an employee on the canal (Anonymous 1956).
[13] Probably Hugh White, whom Fairchild met during the 1921 trip to Panama (Fairchild 1921: 103)
[14] We could not identify this person.
[15] It is likely that this word is a spelling error by Fairchild, and it refers to Lewis Anthony Byrnes (1884–1933; Fig. 8) who was supervisor for the Panama Canal Company (Fairchild 1921: 18, 19).
[16] Frijoles is a site on the Panama Canal railway, the station from which to access BCI by boat.
[17] See Elton et al. (2023) for details of the history of Summit Gardens.
[18] Holger P. Johansen (1898–1935), the first curator of living collections at Summit Gardens (Elton et al. 2023).

avenues, the bamboo into great clumps 40–50 feet tall and the flowering of such species of tree as *Cassia siamea* [Lam., accepted name *Senna siamea* (Lam.) H.S. Irwin Barneby, Fabaceae][19] along the driveways.

[Page 3]
This change is truly spectacular enough but when you add to all this a laboratory on Barro Colorado Island [thereafter BCI on footnotes] where I spent two or more weeks in company with three of the most brilliant and accomplished scientific men in America—in the very midst of the gorgeous tropical jungle—taking photographs with my long Tom camera[20] and working with my microscopes—the transformation from a place where there was no special interest in plants at all to one where a wide circle of people are getting to know about it—is very surprising—and all in 3 years' time.
To make the contrast seen more remarkable, I was privileged to hear in a packed house Dr. Wheeler[21] give a masterly discourse on ants. He said as he left me and went to bed, "I suppose that will be my last lecture on ants. I'm tired talking about them."
I was asked to give a lecture on "Mangosteens and Quarantine"[22] and I did—with lantern slides. See newspaper clippings in previous notebook.[23] At this lecture I showed fruits of *Garcinia tinctoria* [(Choisy) W. Wight, accepted name *Garcinia xanthochymus* Hook.f. ex T. Anderson, Clusiaceae[24]], which Johansen gathered for me from the tree of this species in the driveway.

[Page 4]
Wheeler of Bussey[25] came over to Cristobal to meet us at the steamer and we took the train at once for Panama. From this start off—the glorious green scenery of that ride across the Isthmus is an unforgettable thing anyway—to the last day on this steamer in New York the personality of Wheeler has taken a part—yes, the major part. For of all the persons I have traveled with I think he has proven by far the most excitingly interesting intellectually. His range of erudition is from Goethe and the French authors to the nomenclature of flagellated protozoans or the latest mathematical philosophy or the behavioristic hypothesis of psychiatrists or the principles of the Catholic Church—He is a most amazing personality with the widest range of any I have met in my life I think.
He has a way too as he said Boveri[26] once told him of "getting to the bottom of things."
On this first ride across with Zetek[27] + his wife + daughter who went with us from Havana to Panama on the S.S. Cartago,[28] Molino[29], the active interested young Panamanian assistant who took charge of the boys[30] in the back of the car and Wheeler, I realized that we were in for an

[Page 5]
intellectual treat and it has been one. I am ashamed that so few of Wheeler's remarkable ideas will be found in these notes for I was too busy hearing them to jot many of them down.

We went to the Annex of the Tivoli Hotel,[31] where Wheeler was staying and the first evening took dinner

[19] This is an introduced species from Southeast Asia (Kumar et al. 2017). Common names: Siamese cassia, kassod tree, cassod tree, or cassia tree. The species has been used for its medicinal properties. In some parts of Asia its leaves and flowers are eaten as vegetables.
[20] A special camera designed by Fairchild to take close-up photos of specimens (Fig. 3). See additional details in Fairchild and Fairchild (1914), Mosely (2012), and Tasker (2014).
[21] Entomologist William M. Wheeler (1865–1937; Fig. 1) from Harvard University was an authority on ant biology and taxonomy (Carpenter 1938). He should not be confused with George C. Wheeler (1897-1991), an entomologist from Syracuse University who also joined Fairchild during his visit to BCI (Fig. 1).
[22] Fairchild highly valued the mangosteen, and he promoted the cultivation of this fruit from Tropical Asia in the Canal Zone (Lisio et al. 2024). See note 85.
[23] Page 21 of this expedition report attaches a clipping from the *Star & Herald* newspaper (from August 6, 1924) announcing the talk (see also Online Supplementary Appendix 3). The *Star and Herald* was a Panamanian daily newspaper, published in English and Spanish, from 1920. Today it is still published, but only in Spanish.
[24] A relative of the mangosteen from Tropical Asia (from eastern India and Bangladesh to Taiwan; Ngernsaengsaruay et al. 2023) whose edible fruit can be used to make vinegar and preserves. The dried sap makes the pigment gamboge, used as a dye and in watercolor painting. Common names: False mangosteen, gamboge, yellow mangosteen, Himalayan garcinia, or sour mangosteen.
[25] Bussey Institute, a biological institute at Harvard University. Named after Benjamin Bussey (1757–1842), a wealthy businessman who contributed to the establishment of the Arnold Arboretum.
[26] Theodor Boveri (1862–1915), German zoologist specializing in cytology and embryology.
[27] James Zetek (1886–1959; Figs. 1, 8), entomologist, was one of the founders and first director of the BCI research station until 1956, when he retired (Snyder et al. 1959; Hagen 1990).
[28] The *SS Cartago* (Fig. 6) was operated by the United Fruit Company, and it provided service between New Orleans and Panama with a stopover in Havana. The vessel was at the Havana docks on July 8, 1924 (*Diario de La Marina*. Evening edition 92 (139): 3, 1924). The joint trip that Fairchild made with Zetek from Cuba to Panama on board the *SS Cartago* is also reported in the *Star & Herald* (25(20997): 1,9; July 19; 1924 (Online Supplementary Appendix 3).
[29] Ignacio Molino (Figs. 1, 8) was a Panamanian lawyer who assisted James Zetek in establishing the BCI laboratories (Anonymous 2024). We could not locate additional biographical details of this naturalist.
[30] Graham Fairchild (Fig. 1) and Frederick Burgess (Fig. 1). The latter was a friend of Graham's, and his involvement during this expedition is mentioned by Wheeler (1924, 1925).
[31] A grand hotel run by the Panama Canal Company that was located in Ancon, Panama City. It was the main hub for social events in the Canal Zone.

with Wheeler at a downtown restaurant. We got our meals at the Commissariat Restaurant where their food was very good and very cheap, meals ranging from 35 to 75¢ each. The Annex rate was $1.50 per day for rooms.

The next day we went out to Barro Colorado Island and left the boys with Banks[32] who was already out there. Two days later we came back and the show was then on in full swing. Later Curt Richter[33] came and then the play of intellectual interest was simply like the play of fireworks. Once in a while Wheeler would go and lie down saying

"This is too exciting too exciting." We all bunked in the same room and

[Page 6]
in the morning like a lot of school girls sat on each other's bunks and discussed biological problems at a rate which was to me simply great.
Let me jot down some of the exciting things that I remember.

Wheeler discovered every day or two some new fungus-cultivating ant. He showed me this new ant *Wheeleromyrmex*[34] which lives with a fungus cultivating ant a *Sericomyrmex* [Hymenoptera, Formicidae, Attini][35] (I think it is) as a friend. He described how he saw one of the host ants licking one of these Wheeler ants all over. The Wheeler ant lay back and let itself be licked. He thinks they have a coating of some kind which the host ants like and this is why they tolerate it in the nest. The Wheeler ant tends its own young, eats the mushroom hyphae and goes about just like the host ants.
These live together as peacefully as the negroes do among us whites.[36]
He called my attention to the behavior of the stingless bees. Some of them smell like

[Page 7]
rancid coconut oil. There was one evening a swarming of a whole nest of females. Brown Trigonas [genus *Trigona*, Apidae, Hymenoptera, Meliponini].[37] Young females which came out about dusk and "danced" for 15 minutes violently in the air and like sheep[38] disappeared one by one back into their nest in a hollow tree. There were no males present.

The trails were swarming with interesting insects. Banks brought in about 30,000 I judge and put them in bottles. He and Wheeler both say that the thing which amazed them was the extraordinary number of species represented by only a few individuals of a single kind. Whereas in the North you find myriads of individuals of the same species.

The Calobata[39] [Diptera, Micropezidae, Taeniapterinae] performance which Banks discovered and which we all studied[40] was an amazing thing and one which must affect any theory of heredity which anyone gets up. As Wheeler says the trouble with our studies of biology is that we are animals—a part of biology. The mathematicians +

[Page 8]
physicists + chemists can go far in their study of phenomena for they can get away completely in their studies of things from themselves whereas we continually anthropomorphize—and cannot seem to help it. We view everything alive as though it had emotional value of some kind or other like we have ourselves.

But these Calobatas not over ¾ in long!

Their courtship is as complicated even more so than that of most of the so-called higher animals.

Wheeler says that in some species the male catches an insect and feeds it to the female before mating with it. In others it presents her with a bit of stick or leaf. In others it blows a bubble with its mouth and presents that. In the Calobata it regurgitates a drop of fluid and deposits it on the side of the female's head and she takes it off with her foreleg and puts it in her mouth.

[Page 9]
I cannot feel that it is an imaginary analogy with which we have to deal here. It means that before we can understand

[32] Entomologist Nathan Banks (1868–1953; Fig. 1) from Harvard University (Carpenter Darlington 1954).
[33] Neurobiologist Curt P. Richter (1894–1988; Fig. 1) from Johns Hopkins Medical School, who conducted studies in BCI (Schulkin 2005).
[34] This word is a spelling error by Fairchild, and it refers to *Wheelerimyrmex*; accepted name *Magalomyrmex*, a genus that is native from southern Mexico to South America, reaching BCI (Longino 2010).
[35] This is a neotropical genus with eleven species. Two of them occur in BCI (Ješovnik Schultz 2017).
[36] Fairchild expressed the mainstream views of white people in the U.S. of his time.
[37] *Trigona* is a genus of stingless bees. According to Roubik (2023), this genus has eight species on BCI.
[38] The text gives a simile for the way the insects left; they disappeared one by one like sheep, going to their barn.
[39] *Cardiacephala arthritica* (Borges Ferro 2019).
[40] Wheeler (1924) published a research paper on this insect's behavior based on studies he made when Fairchild was visiting BCI.

the phenomena of the living organisms around us we must stop this way we have of measuring things statically.

Everything is moving. Every attempt to interpret is an attempt to stop the whirling things and take a mental photograph of them. It might be compared to the photograph of a horse in motion, jumping. We discuss everything in nature by comparing these abstractions which are purely static things.

Try to think for example of Man and then discuss his attributes. He is first just two half nuclei in two other individuals—then he is a collision of these two daughter nuclei in the uterus. Then he is a whirling storm of ions, dividing nuclei, splitting chromosomes, cell walls, streaming protoplasm, forming proteins + decaying substances, around that storm center.
[Side note written in the margin by David Fairchild: "This reflection on life is the best I ever wrote and now Sept 1 1948—24 years after it was written, I read it with a feeling of wonder. D. F. Baddeck N. S. (Nova Scotia)."]
Then he

[Page 10]
is visible as a thing large enough for the eye to see—reflecting light + appearing to the eyes of other creatures who have gone through the same performance earlier as a round ball. Later he appears as having a form which resembles the matur[t]er thing. In time he leaves the darkness of the mother "cell" and is thrown out into the light with the habits of his prenatal existence fixed on him. From birth on he is a familiar sight to others of his kind but he is traveling up to puberty + the reproductive stage and then down to senility and old age—always changing—never for a moment stopping in his swift flight from conception to the grave.
It is from this standpoint of a peek into the mysteries of existence that the *Calobata* should be viewed—not by trying merely to think of these flies as though they were tiny human beings.
Is it not marvelous that creatures no larger than a pin should court one another with as remarkable a courtship—yes a more ceremonious courtship by far than that of a monkey—yes than that of millions of human beings? What does it mean? Either the behavior of

[Page 11]
humans is a cosmic thing fixed by cosmic laws and not as man is so fond of believing, a thing controlled by our wills, or these tiny creatures are controlled by their wills and their loves and are like the lovers which we admire in our human existence.

Standing there in the jungle with the sunlight playing on the leaves of a species of Piper + watching these creatures with Wheeler of Harvard and Richter of Johns Hopkins will long remain in my memory as one of the most amazing things I have ever done. It was like peeking over into a new field of wonders which had heretofore been hidden from my view so that I did not even suspect its existence. The dance of the male before the female, the waiting posture of the female, the first kiss of the male, and the periodic regurgitations of the male wiped off by the forelegs of the female are facts of peculiar significance

[Page 12]
if viewed from the standpoint of the behaviorist who is trying to explain sex.

Then too there are the snout beetles [Curculionidae] of which the male has a special pair of pincers with which it pulls the female out when it gets its bill stuck in the wood when it is trying to make a hole in which to lay its egg. I did not see this process but did the pincers of the male which are of very peculiar construction.

The amazing lianas along the trails interested me. The ability of a tendril of one of these to grasp the very tip of a bamboo leaf and hold fast to it and pull itself up was amazing to me. It does it by folding its slender length back + forth over the tip of the leaf. I found it impossible to detach its tendril without har[m]ing the leaf [drawing of liana tendril attached to the tip of a leaf is shown on the right side of this text].

[Page 13]
The growth of aerial roots from the cut end of a giant liana in its attempt to reach the soil, I
photographed and measured (see previous notes).[41]

The strength of the aerial roots of what I take to be *Philodendron lacerum* [(Jacq.) Schott, identified as *Philodendron* cf. *radiatum* Schott (Araceae)][42] which hung from plants perched in the top branches of tall forest trees was such that Graham and Freddy hung + swung on them (see photos).[43]

The extrafloral nectaries of the Ingas [genus *Inga*,[44] Fabaceae] were tremendous—on very young leaves. Ants

[41] See photos 00535 and 00553 (Table 1).
[42] See note 3.
[43] See Photo 00540 (Table 1). However, the photo located in ALFTBG is not of good quality.
[44] *Inga* is a Neotropical genus, well known for having extrafloral nectaries (Koptur 1994).

were drinking from them as horses would from great flat broad fountains. Nectar drops gathered + filled these nectars at night + I found them full to overflowing in the morning.

The fights of ants + termites which we witnessed were as exciting as the cock fights we saw in Panama. The attas [genus *Atta*, Hymenoptera, Formicidae, Attini] refused to fight—simply stalked about among the

[Page 14]
termites[45] like a large St. Bernard dog does among a lot of puppies. Certain small active ants fought the termites to the death. I watched one hang on for 15 minutes to the antenna of a worker termite. How much longer he might have hung I don't know.

I am convinced that one could go to B.C.I. [Barro Colorado Island] + spend months studying these ant termite reactions toward each other.

The orchid *Catasetum viridiflavum* [Hook.],[46] which the boys found on a stump in the lane has the characteristic of throwing its pollinia[47] some distance when touched. Mr. Powell[48] told me he had seen it thrown 2 feet from the flower. This pollinia is of large size and it sticks to the hand so firmly that it takes quite a pull to detach it.

Richter observed that the weeds and shoots coming up from the

[Page 15]
stumps around the house have grown with less rapidity than weeds and water sprouts grow in the North. I am inclined to think he is right about it.

Of course[,] the days were short 12 hours only[,] and there were many very cloudy days so that the amount of sun's energy expended was little in comparison with the sunlight on a summer day of 16 hours in the north.

The most amazing ant on the place was the *Paraponera clavata* [Hymenoptera, Formicidae, Paraponerinae],[49] a jet-black stinging species which comes right out of its nest and attacks you. See photo.[50]

Experiences with Plant Propagating Box[51]

a) The Zinc Plant Propagating Box has the advantage of being air tight. The idea of Leet of enclosing the wooden box completely in zinc + glass is a good one. It permits quick

[Page 16]
access to the box without letting too much air escape. I think side ventilating holes are unnecessary. I have not opened them and unless more heat develops than has on board ship so far I don't think they would be necessary.
(B) A method of labeling the plants is required for one will want to pile it full of seeds, seedlings and cuttings as well as economize space and labels would make this difficult
(C) The method of cooling with damp burlap is all right and the top tank to hold water is O.K. I think
(D) The danger of upsetting the plants when in the box and the cuttings falling out is great. I have not solved the problem of how to hold the sphagnum down. Slats which would be movable might do—or burlap full of many

[Page 17]
holes. Possibly by watching to see that the box is kept always level is the best way.

(E) The danger from shade while the box is in a freight shed turned out not to be so serious as I thought it would. Plants will stand a good deal of shade I find

(F) The chief trouble has been that the sun's heat is not enough to keep a high temperature at night. An electric apparatus or some other small heater will be necessary to supplement the sun's heat or the plants will not strike from cuttings even though they may callous.

(G) Some such collecting case for cuttings which I can carry on shore when we stop ashore and collect is essential. Since there is no electricity in Java['s] rotten hotels[52]

---

[45] There are at least ~60 species of termites on BCI; however, to our knowledge there is no overall study of the termite fauna of the island.
[46] This is a Panama endemic (Fig. 9). Reports on the occurrence of this species elsewhere need further study (Gustavo Romero, Harvard University pers. comm.).
[47] Fairchild used the term *pollenodium* in this report.
[48] Charles Wesley Powell (1854–1927), a self-taught horticulturalist and orchid specialist, established the first large-scale collection of Panamanian orchids (Anonymous 1928).
[49] *Paraponera* is a monotypic genus, and *P. clavata* (known as *hormiga bala* or bullet ant because of its painful bites) has its natural distribution from Central to South America (Pérez et al. 1999).
[50] We could not locate this photo.
[51] We are not certain if during this trip Wardian cases (see note 9, Fig. 14) were used to transport living plants from Panama to the U.S. As an alternative to this kind of container Fairchild makes arguments in favor of zinc and glass propagation boxes.
[52] Fairchild had previously lived in Java for a few months in 1896 (Fairchild 1938: 59–81; Lawrence 1964), where among other topics he studied "fungus gardens of the white ants [termites]" (Fairchild 1930: 385,

I think an alcohol lamp will be necessary though at night there temperatures of 80 at night are common

[Page 18]

(H) Some wedges or metal clamps for making legs to level up the box on a sloping roof of a hatch are necessary.

(I) Better access to the box than the present wire lock is necessary.

(J) A slat shade for the plant box itself would be an advantage.

(K) Some way to use the sides of the box for sprouting seeds would be an advantage

(L) It is entirely too heavy! Must be lighter

At BC [Barro Colorado] Lab. I kept the box just outside the lab and filled stuff into it, and it remained about +80° most of the time and to my surprise many of the plants retained their leaves quite turgescent. Little sunlight. Not more than once did the temp. go to over 90 °F. I had little difficulty in keeping a differential

[Page 19]
between the prop. box and the sun box, by wetting down the burlap.
I put the following things in it in Cuba. Some have calloused and others died and been thrown out.

Cuba:[53]
Annona purpurea [Moc. Sessé ex Dunal (Annonaceae)][54] died (Soncoya). Cuttings

Bread fruit cuttings[55]. Died
Momordica cochinchinensis [(Lour.) Spreng. (Cucurbitaceae)][56] cuttings
still alive + calloused.
Sterculia virginica [Malvaceae][57] seedlings in seed pod, one large with cotyledons green. Some still alive now.
Citrus hystrix [DC. (Rutaceae)[58] Cuttings held color many days but failed to
callous and finally after 4 weeks died.

Panama:

Unidentified liana with thick leaves, rooted plant

Bread fruit (seedless) from Frijoles.[59]
Heliconia hirsuta ? [L.f., *Heliconia vaginalis* Benth, Heliconiaceae][60] B.C. Isl. [Barro Colorado Island]. Lathrop trail.[61] Single plant.
Rheedia lateriflora [L., accepted name *Garcinia humilis* (Vahl) C.D. Adams, Clusiaceae][62] Seeds
Undetermined large flat seeds 2 1/2 inches across
Manicaria saccifera [Gaertn. (Arecaceae)][63] Monkey Cap Palm. Large round dark pollen, seeds

1938: 66–70, 64D, 64E). Subsequently to the 1924 visit to Panama he traveled to this Indonesian island again in 1926 as part of the Allison Vincent Armour Expeditions for the USDA (Fairchild 1927, 1928: 99–101, 1930: 382–444; Francisco-Ortega et al. 2020).

[53] It is not clear why Fairchild provides this list of material from Cuba in this report. One possibility would be that on his way back to the U.S. when the *SS Ulua* made a call in Havana on August 14 (*Diario de La Marina*. Morning edition 92 (225): 3, 1924) these plants were loaded; however, we cannot rule out that these Cuban plants were already grown in Panama in 1924. Previous research (Montes Espín et al. 2021) has shown that Fairchild facilitated moving plant material from Cuba to Panama (mostly to Summit Gardens). A third possibility is that these plants were initially transported from Cuba to Panama on board the *SS Cartago* when Fairchild made this trip from New Orleans to Cristobal in 1924.

[54] The native range of this tree species (common name soncoya) is from Mexico to Venezuela. It has edible fruit, and it is occasionally cultivated (Topete-Corona et al. 2020). In Panama this species is known as tagua

[55] *Artocarpus altilis* (Parkinson) Fosberg, Moraceae.

[56] The native range of this perennial climber (known under the common name of gac), which produces edible fruit, is from China to the Indian subcontinent (Do et al. 2019).

[57] We could not locate the specific epithet *virginica* in the consulted taxonomic literature and databases.

[58] This species (common names: Kaffir lime, makrut lime) is from Southeast Asia and cultivated for the culinary value of its fruit and leaves, particularly in Thai cuisine (Agouillal et al. 2017).

[59] See note 55.

[60] It appears that Fairchild was not certain about the taxonomic identity of this species. *Heliconia hirsuta* L.f. has not been recorded on BCI (Croat 1978). It seems that Fairchild confused it with *H. vaginalis*, which is the most common species of the genus on this island. The latter is native from Mexico to Ecuador (Croat 1978; Kress 2001).

[61] Most of the walking trails on BCI are named after personalities associated with the history of its station (Fig. 2). This particular trail honors Barbour Lathrop (1847–1927), the wealthy philanthropist who was a key person in the early development of Fairchild's plant-hunting and economic botany career and expeditions (Harris 2015: 15–68). During this visit Fairchid sent a letter to Lathrop (August 10) indicating that this was the first trail created on the island in recognition of his sponsorship in establishing the field research facilities there.

[62] The achachairú is a tree with edible fruit (Tome et al. 2019). Regarding its biogeography, reports suggesting that it is a Bolivia endemic (e.g., Tome et al. 2019) need to be revisited as the species is not listed in the most recent floristic catalogue for that country (Jørgensen et al. 2014).

[63] The native range of this palm is Trinidad to Central and South America (Read 2001; Hammel et al. 2003). The species has been reported to have at least 36 ethnobotanical uses. Among them, it provides a source for fiber, edible fruit, and materials for thatching and basketry (Copete et al. 2018). Common names: Napa, cabecinegro, monkey cap.

germinating.[64] from Fort Sherman.[65]
Monkey Fruit.[66] Undetermined
Prosopis [Fabaceae][67]– with red pods. from B. C. [Barro Colorado] Lab.
Isola de las Hormigas [Isla Hormiga][68]

[Page 20]
Rheedia edulis [(Seem.) Planch. Triana, accepted name *Garcinia intermedia* (Pittier) Hammel,
Clusiaceae][69]. Small seeded small
fruited species in tin box

Heliconia mariae ? [Hook.f. (Heliconiaceae)][70] Dark seed in tin box
Heliconia(?)[71] with white flowers in larger
bract. blue in color

in tin box [drawings of (1) a rounded structure with wavy marks and (2) an elliptical structure without any decorations are shown at the right side of this text].

Heliconia sp. ? see painting[72] + specs.
long lax flower cluster [drawings of what appears to be a lax inflorescence is shown at the right
side of this text].

Cahon de Elephante[73]. Large rugose seed. ¾ inch
Immense flat seed. Undetermined.

Seed size of a small saucer

Alpinia [L., likely to refer to *Renealmia* L., Zingiberaceae][74] with pink fruits from Fort
Sherman. Small fine seeds [drawing of what appears to be three seeds is shown as part of the
text]. See photo by Freddy[75]

Spondias lutea [L., accepted name *Spondias mombin* L., Anacardiaceae].[76] Single young plant
with pinnate compound leaves
Heliconia mariae [Hook.f. (Heliconiaceae)][77] seedling etiolated
but may pull through

Acacia multiglandulosa [Schenck, accepted name Vachellia melanoceras (Beurl.) Seigler Ebinger,
Fabaceae][78] in tin box. may live!

I propose to put below in the sun box the following 6 potted seeds.
Pots 1 + 4 *Rheedia lateriflora* [L., accepted name *Garcinia humilis* (Vahl) C.D. Adams, Clusiaceae].[79]
[Drawing of a rounded structure without any decorations is shown at the right side of this text]. Probably not this species but *R. madruno* [(Kunth) Planch. Triana, accepted name *Garcinia madruno* (Kunth) Hammel][80] as evidenced by Lee's Herb. specimen see p. 219 of their book.

2-3-5 *Heliconia* [Heliconiaceae] (sp. see painting[81])

[64] The content of this text is not easy to interpret. The pollen of this species it is not black; however, the seeds have this color and are relatively large (~5 cm in diameter).
[65] Fort Sherman was a military base located at the Caribbean end of the Panama Canal, on the west bank. Most easily accessed from BCI by boat across Gatun Lake.
[66] *Artocarpus lakoocha* Wall ex Roxb. (Moraceae) is also known by the common names: monkeyjack and lakoocha. It has a native range from India to South-East Asia. Its bark is used to treat skin ailments, and it bears edible fruit (Jagtap Bapat 2010).
[67] *Prosopis sensu lato* is native to the Old and New Worlds and includes the mesquites and New World algarrobos. Recent phylogenetic studies support the genus is actually split into six genera, with *Prosopis* L. *sensu stricto* found in the Old World. The Central American species of this group are currently accommodated in *Neltuma* Raf. (Hughes et al. 2022); however, none of the species of this group has been reported as growing naturally on BCI (Croat 1978).
[68] Small island located near BCI, Colon Province, now in Colon Province, though in the Canal Zone until 1979.
[69] This species has a native range from Mexico to Panama (Andrés-Agustín et al. 2021). It is sometimes cultivated for its edible fruit. It is known under the common names lemon drop mangosteen, cherry mangosteen, limoncello, and toronjil. The species also has medicinal properties.
[70] This species' native range is from Guatemala to Colombia and Venezuela (Kress 1984; Kress et al. 2004; Rangel Marquina et al. 2016). Common names: Platanillo or beef steak (Fig. 12).
[71] The genus *Heliconia* (~100 species) is native to the Neotropics, Pacific Islands, and Tropical Asia.
[72] Pencil drawing made by Fairchild is shown adjacent to this text.
[73] Interpreted as *Dillenia indica* L., Dilleniaceae (common names: Elephant apple, ou tenga). Its fruit is used to make curries and jams, and it is native from India to Borneo (Oldfield 2020).
[74] *Alpinia* does not grow naturally in Panama and we interpreted that Fairchild was referring to *Renealmia*, a genus with ~150 species, with a natural distribution in the Neotropics and Tropical Africa.
[75] We could not locate this photo.
[76] This species bears the common names yellow mombin and hog plum, and has its native range from Mexico to Brazil (Mitchell Daly 2015). It has various medicinal uses.
[77] See note 70 (Fig. 12).
[78] This is a Panamanian endemic (common name Cachito; Fig. 11), and one of the species of the genus with large stipular spines that host aggressive ants, belonging to the *Pseudomyrmex ferrugineus* group, Hymenoptera, Formicidae, Pseudomyrmecinae (Seigler Ebinger 1995; Ward Branstetter 2017).
[79] See note 62.
[80] This is a species native from Central to South America. Common names: Charichuela, canime, currucay, or palo de aceite.
[81] See note 71.

6 *Heliconia mariae* [Hook.f. (Heliconiaceae)][82]

[Page 21]
Large seed of Ivory Nut Palm[83] loose
in sphagnum 3 cornered [+ sketch].

Large seed of *Lucuma mam[m]osa*[84] [accepted name *Pouteria sapota* (Jacq.) H.E.Moore Stearn, Sapotaceae for *Sapota mammosa* Mill.] rough yellow

[Newspaper clipping announcing the talk on mangosteens that Fairchild delivered. Handwritten text by David Fairchild on this clip reads: "Aug. 6th, Star Herald."][85]

[82] See note 70 (Fig. 12).
[83] *Phytelephas seemannii* O.F. Cook., this is a palm native to Colombia and Panama whose seeds are used for crafting. The seeds were also used for making buttons before plastic. The species is known as tagua in Panama.
[84] We could not find the name "*Lucuma mammosa*" in the taxonomic literature, and it appears that Fairchild was referring to *Sapota mammosa* (Accepted name *Pouteria sapota*). *Pouteria sapota* is considered to have a native distribution from southern Mexaco to Nicaragua (Pennington 1990). It has the common names mamey zapote, mamey, and zapote; and it is widely cultivated for its edible fruit.
[85] See note 22.

APPENDIX 2

Terrestrial invertebrate taxonomic index: Insect and spider species reported by David Fairchild during the 1924 trip to Panama.

Accepted species name	Native distribution	Photo number in Fairchild Tropical Botanic Garden records / Figure number in this paper	Page number in Fairchild's (1924a) report
Apterostigma collare, Formicidae, Attini	Costa Rica and Panama	00542 / -	
Apterostigma sp., Formicidae, Attini	Mexico to South America	00541 / -	
Atta cephalotes, Formicidae, Attini	Mexico to Argentina	00549, 00660 / 3	13
Cardiacephala arthritica, Micropezidae, Taeniapterinae [*Calobata* sp.][a]	Belize to Venezuela	- / -	7, 8, 10
Eciton hamatum, Formicidae, Dorylinae	Mexico to Brazil	00662 / -	
Ectatomma tuberculatum, Formicidae, Ectatommini	Mexico to Argentina	00551 / -	
Magalomyrmex, Formicidae, Solenopsidini	Mexico to Argentina		6
Mycetophylax strigatus complex, Formicidae, Attini	Central to South America	00546 / -	
Paraponera clavata, Formicidae, Paraponerinae	Honduras to Argentina	- / -	15
Sericomyrmex sp., Formicidae, Attini	Mexico to Brazil	00550a / -	6
Sericopelma sp., Araneae, Theraphosidae	Central America	00537 / 3	
Termitoidae sp., Isoptera	Worldwide	- / -	13, 114
Trachymyrmex sp., Formicidae, Attini	United States to Argentina	00443, 00545 / -	
Trigona sp., Apidae, Meliponini	Mexico to Argentina	00547 / -	7

[a] The species reported by Fairchild (1924a) as *Calobata* sp. was identified as *Cardiacephala myrmex* [accepted name *C. arthritica*] by Wheeler (1925).

APPENDIX 3

Plant taxonomy index: Species reported/collected by David Fairchild during the 1924 trip to Panama. Plants from Cuba or Panama that were transported on board the *SS Ulua* are indicated with one or two asterisks respectively.

Accepted species name[a]	Native distribution	Photo number in Fairchild Tropical Botanic Garden records / Figure number in this paper	Page number in Fairchild's (1924a) report	USDA germplasm accession number
**Annona purpurea* Moc. & Sessé ex Dunal, Annonaceae	Mexico to Venezuela	- / -	19	
*, ***Artocarpus altilis* (Parkinson) Fosberg, Moraceae	Malaysia and Philippines	- / -	19	
***Artocarpus lakoocha* Wall. ex Roxb., Moraceae	Tropical Asia	- / -	19	
Catasetum viridiflavum Hook., Orchidaceae	Panama[b]	00534, 00664 / 9	14	
Chamaedorea sp., Arecaceae	Mexico to South America	- / -		61626
Citrus × *aurantiifolia* (Christm.) Swingle, Rutaceae	Southeast Asia	- / -		61312
**Citrus hystrix* DC., Rutaceae	Southeast Asia	- / -	19	
Cojoba rufescens (Benth.) Britton & Rose [*Inga rufescens* Benth.], Fabaceae	Central America to Ecuador	- / 13		61628
***Dillenia indica* L., Dilleniaceae	Tropical Asia	- / -	20	
Elaeis guineensis Jacq. [*E. melanococca* Gaertn.], Arecaceae	Tropical Africa	- / -		61627
***Garcinia humilis* (Vahl) C.D.Adams [*Rheedia lateriflora* L.], Clusiaceae	Neotropical	- / -	19, 20	61631
***Garcinia intermedia* (Pittier) Hammel [*Rheedia edulis* (Seem.) Planch. & Triana], Clusiaceae	Mexico to Panama	- / -	20	

(Continued)

Accepted species name[a]	Native distribution	Photo number in Fairchild Tropical Botanic Garden records / Figure number in this paper	Page number in Fairchild's (1924a) report	USDA germplasm accession number
Garcinia madruno (Kunth) Hammel [*Rheedia madruno* [(Kunth) Planch. & Triana], Clusiaceae	Central to South America	- / -	20	
Garcinia xanthochymus Hook.f. ex T. Anderson [*G. tinctoria* [(Choisy) W. Wight], Clusiaceae	Tropical Asia	- / -	3	
****Heliconia* cf. *mariae* Hook.f., Heliconiaceae	Guatemala to Colombia and Venezuela	- / 12	20	
** *Heliconia vaginalis* Benth. [*Heliconia hirsuta* L.f.[c]], Heliconiaceae	Mexico to Ecuador	- / 12	19	
****Heliconia* sp., Heliconiaceae	Tropical America, to Malaysia and Pacific	- / -	20	
Hura crepitans L., Euphorbiaceae	Caribbean Islands, and from Central to South America	00965 / 12		
Inga sp., Fabaceae	Mexico to South America	00544 / -	13	
****Manicaria saccifera* Gaertn., Arecaceae	Trinidad, and Central to South America	01537 / 10	19	61629
**Momordica cochinchinensis* (Lour.) Spreng., Cucurbitaceae	Tropical Asia and Australia	- / -	19	
Philodendron cf. *radiatum* Schott [*P. lacerum* (Jacq.)] Schott,[d] Araceae	Mexico to Colombia	00540		
****Phytelephas seemannii* O.F. Cook, Arecaceae	Colombia and Panama	- / -	21	
** *Pouteria sapota* (Jacq.) H.E.Moore & Stearn [*Lucuma mammosa*[e]], Sapotaceae	Mesoamerica	- / -	21	
Prioria copaifera Griseb., Fabaceae	Jamaica and Nicaragua to Colombia	- / 13		61630
****Prosopis* sp. *sensu lato*, Fabaceae	Tropics and subtropics	- / -	19	
****Renealmia* sp. [*Alpinia* sp.], Zingiberaceae	Tropical Africa and Americas	- / -	20	
Senna siamea (Lam.) H.S. Irwin & Barneby [*Cassia siamea* Lam.], Fabaceae	Southeast Asia	- / -	2	
****Spondias mombin* L. [*S. lutea* L.], Anacardiaceae	Mexico to Brazil	- / -	20	
Sterculia sp., Malvaceae	Tropics and Subtropics	- / -		61632
**Sterculia* virginica,[f] Malvaceae	Unknown	- / -	19	
****Vachellia melanoceras* (Beurl.) Seigler & Ebinger, [*Acacia multiglandulosa* Schenck], Fabaceae	Costa Rica and Panama	00548, 11795, 12321, 12322, 12325, 12326, 12328 / 11	20	

[a] Name provided by David Fairchild is shown in brackets when it differs from the accepted name.
[b] This is a Panama endemic; reports on the occurrence of this species elsewhere need further study (Gustavo Romero, Harvard University pers. comm.).
[c] *Heliconia hirsuta* L.f. has not been recorded on BCI (Croat 1978). It sems that Fairchild confused it with *H. vaginalis* Benth., which is the most common species of the genus on this island.
[d] *Philodendron lacerum* is a Caribbean Island endemic. The species was misidentified by Fairchild (see note 3).
[e] We could not locate the specific epithet *mammosa* in the consulted taxonomic literature and databases. It seems that Fairchild was referring to *Sapota mammosa* Mill.
[f] We could not locate the specific epithet *virginica* in the consulted taxonomic literature and databases.