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**PROCEEDINGS
OF THE
CARIBBEAN FOOD CROPS SOCIETY**



**TENTH ANNUAL MEETING
PUERTO RICO**

1972

VOLUME X

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CARIBBEAN FOOD CROPS SOCIETY

OFFICERS 1971-72

President:	Dr. Miguel Lugo, Puerto Rico
Vice-President:	Dr. Ernesto Hernández, Puerto Rico
Secretary-Treasurer:	Dr. George Samuels, Puerto Rico
Board of Directors:	
Chairman	Mr. H. A. D. Chesney, Guyana
Member	Mr. Juan Pablo Duarte, Jr., Dominican Republic
Member	Dr. Courtney Henry, Trinidad
Member	Mr. W. de Coursey Jeffers, Barbados
Member	Dr. A. G. Naylor, Jamaica
Member	Dr. J. E. Salette, Guadeloupe
Member	Dr. A. Sotomayor, Puerto Rico

MINUTES OF THE BUSINESS SESSION
JUNE 16, 1972

The business meeting was called to order by the President, Dr. Miguel Lugo at 11:30 a.m. at the Borinquen Hotel, San Juan, P.R. on June 16, 1972.

The minutes of the previous meeting in Guyana in 1971 was read and approved.

The treasurer's report was read and approved.

Old Business: None reported.

New Business:

1. Mr. W. de Coursey Jeffers presented Barbados as the proposed site of the 11th Annual Meeting of the CFCS in 1973. The gracious offer was unanimously approved by the members.
2. Mr. A. Naylor presented Jamaica as the proposed site for the 12th Annual Meeting CFCS in 1974. The site choice was approved by the members.
3. The Nominating Committee under the chairmanship of Mr. George Jackson, presented their recommendations for the officers for 1972-73. They were as follows:

President of the Board	Dr. Miguel Lugo	Puerto Rico
Board of Director	Mr. G. Anais	Guadeloupe
Member	Mr. H. A. D. Chesney	Guyana
Member	Mr. E.G.B. Gooding	Barbados
Member	Dr. C. Henry	Trinidad
Member	Mr. A. G. Naylor	Jamaica
Member	Mr. C. Walters	Antigua
President	Mr. DeCoursey Jeffers	Barbados
Vice-President	Mr. Ronald Baynes	Barbados
Secretary-Treasurer	Dr. George Samuels	Puerto Rico

The report was received and all proposed officers were elected unanimously.

4. Mr. James pointed out that the 1970 & 1971 Proceedings have still not been issued. He asked that the CFCS Proceedings be published as soon as possible after each meeting.
5. Mr. Baynes proposed that CFCS rather than the member country publish the proceedings.
6. Mr. Chesney moved that an Editorial Committee be appointed. Their functions would be to supply guide lines as to style of presentation and edit papers for the Proceedings. Two members will serve on Editorial Committee for each subject; the editor for the particular proceedings will be from the country in which the meeting was held: 2nd, Banes; passed.
7. Mr. Turnbull proposed that more attention be given at our meetings to agricultural extension. He pointed out that there exists a large gap between research and farmers using these practices. Efforts should be made to see how we best can get research conveyed to the farmer. There should be more extension education work presented at the meetings. It is of interest of all members that our respective governments be encouraged to see that local foods are correctly marketed.
8. Mr. James added that more economic evaluation of the research findings are needed for correct extension work.

9. Mr. Williams proposed that the highlights of the various papers be extracted and presented to the members at the end of the meeting.

10. Mr. Ward pointed out that many of the papers presented at the Puerto Rico meeting were not written up and mimeographed copies presented to the members present.

11. Mr. Jeffers took the floor to thank the membership for electing him president. He announced that the meeting in Barbados would be probably in June, members should get their papers written early with 100 copies available, and that onions would be the theme of the special session for the next meeting.

12. Mr. James asked that the secretary record a vote of thanks by the membership to the organizing committee in Puerto Rico for their excellent work.

There being no further business, the meeting was adjourned.

TREASURER'S REPORT

1. BALANCE: Bank Statement, June 11, 1971	\$ 2,403.62
2. RECEIPTS: June 12, 1971 to June 10, 1972	<u>846.00</u>
Subtotal	\$3,249.62
3. EXPENSES: June 12, 1971 to June 10, 1972	
Travel expenses, Guyana meeting	\$ 328.00
Newsletter & printing	23.25
Postage, telephone, & cables	66.50
Stationery	63.41
Certificates & Invitations	108.00
P.R. meeting fund	<u>225.00</u>
4. TOTAL EXPENSES	\$ <u>814.16</u>
5. BALANCE: June 10, 1972	<u>\$2,435.46</u>

REGISTERED PARTICIPANTS IN 10th ANNUAL MEETING CPCS

<u>COUNTRY</u>	<u>NAME</u>	<u>COUNTRY</u>	<u>NAME</u>
ANTIGUA	S. Forde O. M. Swift* C. J. Walter	ST. VINCENT	G. White
BARBADOS	W. DeCoursey Jeffers E.C.B. Gooding* J. Ward	SURINAM	A. H. Van Dijk
CURACAO	H. J. Riese*	TRINIDAD	B. R. Cooper J. Cropper L. Gross L. James G. Sammy D. B. Williams
DOMINICAN REPUBLIC	J. Dupuy	U.S.A.	H. V. Bartoo*
FRENCH GUIANA	J. F. Brochier P. H. Blancaneaux J. F. Turenne	U.S.V.I.	D. S. Padda*
GUADELOUPE	R. Arnolin G. Anais J. P. Ginoux* C. Messiaen* P. Pauvert*	UNIV. WEST INDIES	D. A. Baynes R. E. Pierre L. Ranking B. Springer
GUYANA	H. A. D. Chesney Onewale	PUERTO RICO	W. Allison L. Almodovar J. Altieri A. Ayala* R. Calvesbert M. Capiel V. Colón J. Cuevas R. del Valle* C. González-Molina E. González-Tejera* E. Hernández* L. Hernández* G. Jackson M. A. Lugo-López* L. Mejia-Mattei A. Pérez J. H. Rodríguez-Arias G. Samuels A. Sotomayor* J. Vélez-Fortuño A. Vélez-Ramos
JAMAICA	D. Dempster P. Jackson H. Miller* A. G. Naylor H. Payne* V. Turnbull D.E.S. Webb C. C. Weir		
MARTINIQUE	P. Daly F. Gabriel*		
NICARAGUA	A.G. Fernández*		
ST. KITTS	C. Quashie K. Martin		
ST. LUCIA	C. George		

GENERAL PROGRAM

Sunday : Arrival San Juan International Airport and transfer to flight to
 June 11 Mayaguez and to the Mayaguez Hilton Hotel, welcome and registration
 Monday a.m. : 8:00 - Registration at Conference Room of the Library Building,
 June 12 U.P.R. Mayaguez Campus
 9:00 - Opening Session
 10:30 - Orientation Session
 p.m. : 12:30 - Lunch
 2:00 - Technical Session I
 3:30 - Tour of University of Puerto Rico, Mayaguez Campus, Federal
 Experiment Station and Puerto Rico Nuclear Center
 7:00 - Cocktail Party, Hostos Salón, Mayaguez Hilton Hotel
 Tuesday a.m. : 6:00 - Depart from hotel to the Fortuna Substation
 June 13 8:30 - Technical Session II
 10:15 - Technical Session II (continued)
 11:30 - Tour of Fruit and Vegetable Research Plots
 p.m. : 1:30 - Cocktail and Lunch at Esperanza Beach, Courtesy of Don @
 Rum and Cafeteros de Puerto Rico
 4:30 - Depart for the Mayaguez Hilton Hotel
 Wednesday a.m. : 8:00 - Technical Session III, Library
 June 14 9:30 - Technical Session III (continued)
 10:45 - Depart for the Isabela Substation
 11:45 - Tour of the Isabela Substation
 p.m. : 12:30 - Courtesy Lunch
 2:15 - Depart for Pineapple Cannery at Manati
 3:30 - Arrive and tour the Pineapple Cannery
 5:00 - Depart for the Borinquen Hotel
 Thursday a.m. : 7:00 - Depart for the Corozal Substation
 June 15 8:30 - Arrive at the Corozal Substation
 9:00 - Technical Session VI
 11:00 - Tour of Crops Research Plots and Agricultural Machinery
 p.m. : 12:15 - Courtesy Lunch
 2:00 - Depart for Bacardi Distillery
 3:30 - Arrive at Bacardi. Tour rum distillery. Cocktail Party
 5:00 - Depart for the Borinquen Hotel
 Friday a.m. : 8:00 - Technical Session V at Hotel Borinquen
 June 16 10:00 - Technical Session V (continued)
 11:15 - Business Meeting
 p.m. : 12:00 - Lunch
 1:00 - Depart for the Agricultural Experiment Station, Rio Piedras
 1:30 - Tour of the Agricultural Experiment Station Laboratories,
 Greenhouses and Food Technology Laboratory
 4:30 - Cocktail at the Rum Pilot Plant
 7:30 - Cocktail at the Borinquen Hotel
 8:30 - Tenth Anniversary Banquet

TECHNICAL PROGRAM

Monday, June 12

OPENING SESSION

9:00 a.m.

Dr. M. A. Lugo-López, President CPCS, Presiding
 Prof. Rafael Pietri Oms, Chancellor U.P.R., Mayaguez Campus, Welcome Address
 Dr. Thomas Haydon, Exec. Director North South Center, Dept. of State, Welcome Remarks
 Dr. Ronald L. Perusse, "A Strategy for Caribbean Economic Integration, The Agricultural Sector"

ORIENTATION SESSION - "PUERTO RICO'S AGRICULTURE"

Dean Salvador E. Alemany, Dean College of Agricultural Sciences, Presiding
 Dr. Modesto Capiel - "Climate of Puerto Rico"
 Mr. Luis Rivera - "Soils of Puerto Rico"
 Dr. Luis Mejía-Mattei - "Economic Facts of Puerto Rico"
 Mr. José Muratti - "Crops of Puerto Rico"

TECHNICAL SESSION I

1:30 p.m.

Dr. M. Pérez-Escobar, Acting Director, Agr. Exp. Station, Presiding
 E.A.B. Gooding, "Plant Responses to Tropical Conditions"
 L. M. Cruz-Pérez, A. Morales & J. Domenech, "A Progress Report on the Evaluation of Varieties and Planting Dates of Cabbage in P.R."
 M. Rico-Ballester, "Varieties & Planting Dates of Onions in P.R."
 N. G. Vakili & D. W. Walker, "Differences in Susceptibility of Bean Varieties to Pega Pega"
 R. Abrams & F. Juliá, "Effect of Planting Time, Plant Population and Row Spacing on Yield of Pigeon Peas"
 D. W. Walker & N. G. Vakili, "Bean Pod & Seed Damage by Bean Pod Borer"
 J. O. Webster & H. Cruzado, "Sorghum Improvement Project in Puerto Rico"

Tuesday, June 13

TECHNICAL SESSION II

8:30 a.m.

Er. Ernesto Hernández, Dir. Dept. of Agron. & Soils, Agr. Exp. Stat., Presiding
 B. Eavis, "Direct Seeding of Vegetable Crops Under Tropical Conditions in Barbados"
 R. Baynes, "Influence of Plant Density and Row Width on Corn Yield on Three Soils in the Eastern Caribbean"
 R. A. Baynes, "Effects of Fertilizer Placement & Time of Application on Corn Yields on Some Soils in the Eastern Caribbean"
 G. C. Jackson, L. Almodóvar, G. Mangual, and C. Sierra, "Vegetable Herbicide Studies in Puerto Rico 1970-72"
 P. Daly, J. Thonet & M. Soitout, "A Study on the Influence of Shade on the Growth of Peppers"
 C. M. Messiaen, "Some Observations on Tropical Spinach Species & Varieties"
 P. Jackson & H. Payne, "Variety Testing of Red Kidney Beans in Jamaica"

Wednesday, June 14

TECHNICAL SESSION III A-AGRONOMIC

8:00 a.m.

Dr. F. W. Martin, Officer in Charge, Federal Expt. Station, Presiding
 J. Cuebas Ruiz & F. K. Koo, "Quality Improvement in Plantain by Selection"
 B. G. F. Springer, "Experimental Design & Analyses Under Limited Resources"
 J. Brochier, "A Simplified Method of Growing Vegetables Under Hydroponic Sand Culture"
 J. Brochier, "Cost of Production of Vegetables Produced Under Hydroponic Sand Culture"
 St. Claire M. Forde, "Factors Affecting Tomato Production in the Leeward Islands"
 E. González-Tejera, "The Effect of Nitrogen and Hormone Treatment in Pineapples: Preliminary Results"
 H. W. Payne, "Peanut Cultivation in Jamaica & Response to Fertilization"
 P. H. Blancaneaux, "Podzolisation a Curious Process of Impoverishment of the Soils in the Extreme Northern Region of French Guyana"

TECHNICAL SESSION III B-PATHOLOGY

8:00 a.m.

- Mr. A. G. Naylor, Ministry of Agr., Jamaica
 R. E. Pierre & M. Turner, "Control of Rust & Cercospora Leaf Spot of Peanuts in Jamaica"
 D. Norse, "The Control of Peanut Diseases in Barbados"
 G. Anais, P. Ksan, "Trial of Cantaloupe Charentais, Muskmelon Breeding Lines for Watermelon Mosaic Virus (WMV) Resistance & Mildew Tolerance"
 P. Daly, "Study of Three Varieties of Tomatoes Tolerant to Pseudomonas Solanaceum"
 P. Daly, J. Thonet, & M. Soitout, "Research with a New Variety D'Aubergine Tolerant to Pseudomonas Solanaceum"
 C. M. Messian, M. Beramis, & M. Berniac, "Compared Virulence of Pseudomonas Solanaceum in Different Types of Soils"
 P. Pauvert, J. P. Ginoux, P. Ricci, & A. Bayries, "Control of Vegetable Legume Diseases by Fungicidal Seed Treatment"
 J. Fournet & G. Jsaque, "Control of Lettuce Diseases by Fungicidal Spray & Soil Drench"
 P. L. Maléndez, "A Leaf Spot of Cucumber Caused by Corynespora Cassicola in P.R."

Thursday, June 15

TECHNICAL SESSION IV

9:00 a.m.

- Dr. A. Ayala, Asst. Dean, College of Agr. Sciences, Presiding
 F. Abruña & R. Pérez-Escobar, "Effect of Soil Acidity on Food Crop Yields"
 J. F. Turenne, Evapotranspiration, Field Humidity & Soil Organic Matter
 Evolution Under Condition of Savannah Grass in French Guyana"
 L. B. Rankine, "Some Features of the Market for Selected Root Crops in the Commonwealth Caribbean"
 R. Arnolin, "Yam Introduction in French West Indies"
 Omwale, "Growth & Dormancy of Yams"
 A. Sotomayor, "Plantain Research in Puerto Rico"

Friday, June 15

TECHNICAL SESSION V

8:00 a.m.

- Mr. F. Sánchez-Nieva, Chemical Engineer, Food Technology Laboratory, Agr. Exp. Station, Presiding
 M. González-Román, "Yam Storage"
 E.G.B. Gooding, "The Processing of Yam Flakes in Barbados"
 L. E. Cancel, "Chlorophyll in Citron"
 H. Cancel, "Some Aspects of Storage Conditions of Red Spanish Pineapple"
 J. Cropper, "Prospects of Vegetable Processing in Trinidad"
 D. S. Padda & C. A. Cahoon, "Production & Marketing of Fresh Vegetables & Fruits in the U.S. Virgin Islands"
 G. M. Sammy, "Food Technology Development at the University of the West Indies"
 A. Ayala, M. Colón-Ferrer, D. Cuevas, Increase in Tomato, Pepper, & Okra Production in Sandy Soils Through Soil Fumigation"

A STRATEGY FOR CARIBBEAN ECONOMIC INTEGRATION
THE AGRICULTURAL SECTOR

Address of Roland L. Perusse, Professor of Political
Science, Inter American University before the Carib-
bean Food Crops Society 10th Annual Meeting, Mayaguez,
Puerto Rico, June 12, 1972

Early in January each year the Governor of Puerto Rico delivers his annual message to the legislature. The message covers a wide range of subjects, and the Governor is interrupted frequently by applause. Some of the applause is perfunctory; some is loud and prolonged. The passage that draws the loudest and longest applause each year is the Governor's promise to revitalize and rejuvenate the sugar industry of Puerto Rico.

Ladies and gentlemen - The sugar industry of Puerto Rico has been sliding downhill for 20 years! Twenty years ago - in 1952- Puerto Rico produce 1.4 million tons of sugar. Last year - in 1971- Puerto Rico produce only 320,000 tons. All but three of the island's sugar mills have closed down or been taken over by the government. An the government of Puerto Rico continues to pour more and more money into this dying industry -to the cheers of the people of Puerto Rico!

I tell this story about Puerto Rico to illustrate how romanticism, sentimentality and set patterns can block the way to sensible agricultural policies. Here intelligent men refuse to read the hand writing on the wall. They promise better luck next year when the trend for two decades has been downward. They expect to wreck economic miracles with modernization, mechanization, subsidies and incentives.

The truth of the matter is that Puerto Rico has no business growing sugar. We lost our competitive position years ago. There are more profitable agricultural and non-agricultural uses to which our land can be put. A study last year by Checchi and Company, a reputable firm of agricultural consultants in Washington, D. C., list eight products which can be grown in Puerto Rico more profitably than sugar. The profit per acre from sugar is at best \$200. In comparison, ten times as much (\$2,045) can be earned from an acre of peppers, five times as much (\$1,048) from an acre of avocados, and nearly five times as much (\$981) from an acre of tomatoes. An acre of plantains will yield \$430; of pineapple; \$367; of yautias, \$333; of oranges, \$267; and of pigeonpeas, \$240.

This report has been blissfully filed away by the government as it passes more bills for subsidies to sugar workers and sugar producers. It is expected that \$100,000,000 will be spent in five years in an effort to revive the industry. Recently the Governor signed a bill to give sugar workers an additional wage subsidy which will total 7.4 million dollars in the next fiscal year.

Sugar-growing has become a political and emotional issue in Puerto Rico. To point out that the emperor has no clothes is -the height of heresy. Sugar is considered part of the life and culture of the people. Believe me, I do not wat to be accused of insensitivity to Puerto Rican culture. But if this is reason for seeking to preserve the sugar industry, we should recognize that fact, that sugar growing is a cultural rather than economic activity. We should keep a few mills and railroads as museum piecas, administered by the Institute of Puerto Rico Culture. But let us not delude ourselves into believing that sugar has a rational economic base in Puerto Rico.

Significant work in testing fruits and vegetables has begun at the Isabela Sub-station Agricultural Experiment Station of the University of Puerto Rico. For example, 16,000 pounds pepper have been grown on one acre of land in two harvests with a market value of \$2,400. But this is only a start, and the funds for this effort are miniscule compared with the millions being spent in the vain effort to make sugar competitive.

The story of agriculture in Puerto Rico is the story of agriculture throughout the Caribbean. Generally speaking, Caribbean countries are producing the wrong crops spurred by quotas and preferences, many of the countries produce but one or two primary products for export to a metropolitan power. Thus they are entrapped in a classic mercantile pattern which keeps them in a state of perpetual economic and political dependence. There are strong forces working to preserve this status quo and resisting any change.

The greatest need in the Caribbean in the agricultural sector is to diversify agriculture, preferably on a regional basis. There is need to produce fruits and vegetables and other food crops, principally for import substitution, but in some cases, also for export. In this way, Caribbean countries can help their balance of trade situation, provide for their nutritional needs meet the food requirements of a growing tourist industry and lesser their economic dependence on extra-regional powers. There is no logic, for example, in Puerto Rico importing orange from Florida and California. We should be exporting oranges to the United States.

Rationalization of agriculture in the Caribbean is closely linked to rationalization of the general economy of the region. For example, truck farming is intimately linked to food processing industry and tourism. The three principal sectors: agriculture, industry and tourism must be closely coordinated.

I have brought along some copies of a recent book, A Strategy for Caribbean Economic Integration, which are available for those of you interested in exploring this link. A principle recommendation of this book is that all countries of the Caribbean abandon sugar except Belize, Cuba, the Dominican Republic, and St. Kitts. (I would now eliminate St. Kitts from the list) The other countries of the Caribbean simply are not competitive in sugar, or can utilize their land in some other manner for greater economic gain.

I recognize the tremendous problems involved in the readjustment of agriculture -not only economic but social, scientific and psychological problems as well. Workers have to be retrained. Attitudes have to be changed. Soils, seeds, pesticides and fertilizers have to be tested. Irrigation may be necessary. New markets will have to be found and the entire infrastructure readjusted. Storage, refrigeration and transportation facilities must be provided. These are all basic to change and carry for reaching implications. But the important thing is to recognize the irrational character of agriculture in the Caribbean today and to begin laying. The foundations for change rather than perpetuating and further propounding the irrationalities.

The transition will take time and must be carefully planned. But the ultimate rewards of fuller employment, higher earnings and economic independence fully justify the effort.

In conclusion, I would like to stress that agricultural reform in the Caribbean can not be successful without overall economic reform, and indeed overall economic reform can not be successful unless it is undertaken in concert among all nations of the Caribbean. The peoples of the region number only 27,000,000 and even if the millennium were reached, of a smoothly operating Caribbean Common Market, it would be one of the smallest Common Markets of the World scene, and our region would still find it difficult to compete with the Common Markets of the United States, The Soviet Union, Europe or even Latin America. I say this not to be discouraging -on the contrary for the Caribbean region. The choice is either further economic disintegration or some degree of competitiveness as a result of working together.

During late 1970 and early 1971 I had the opportunity to visit each of the 26 countries. I spoke to the heads of government, opposition leaders, businessmen and intellectuals. I asked about their basic values, national goals and development needs. I asked them what they thought was necessary, not only for economic viability in their own countries, but also economic viability throughout the region. Invariably the need for close economic cooperation was recognized.

The views, opinions and conclusions of the Caribbean leaders are set forth in the book I mentioned previously -A Strategy for Caribbean Economic Integration. Based on these findings, I arrived at four principle recommendations for the formation of a viable Caribbean Community:

- 1) Strengthening CARIFTA and the Caribbean Development Bank both functionally and through adding more members.
- 2) Calling of a heads of government meeting as soon as possible to discuss the possibility of forming a Caribbean Common Market.
- 3) Federation of the British Associate States.
- 4) Overall regional economic planning, diversification and integration.

Thus, the road to economic progress is laid out. Whether the nations of the Caribbean choose this road, or any other, remains to be seen. I have received some very flattering letters about the book but I have seen very little in the way of concrete action along the lines at my recommendations. On the contrary, it seems though most of the nations are proceeding merrily with their national economic planning quite oblivious of the national plans of others.

I don't know what it will take to shock the Caribbean into economic reality. It may be another depression, the loss of quotas and preferences, drought, war, or other disaster. Sometimes we respond only to crisis situations. But sugar and bananas are

declining as sources of revenue; unemployment is rising, so are the expectations of our people. If those who are in a decision making position today do not take the steps to bring about economic reforms in the Caribbean, somebody else will. The crisis is upon us and we must respond.

The Caribbean has gone through five historical stages. The pace has been different in different countries because of uneven social, economic and political development. Basically these stages have been (1) pre-Columbian, (2) colonial, (3) slave plantation, (4) emancipation, and (5) some degree of political independence. But emancipation and political independence have never been complete because the economics of most of the Caribbean States have been dominated by outside influences. A Sixth Stage, then, is required-economic independence. And economic independence for the region can be arrived at only through economic integration.

Caribbean Food Crops Society
1972
Sustaining Members

West India Machinery & Supply Co.
G.P.O. Box 4308
San Juan, P.R. 00936

Nestlé Products Inc.
G.P.O. Box 2170
San Juan, P.R. 00936

Bromelias de F.R.
Naranjito, P.R.

Productos Libby's International, Inc.
G.P.O. Box 3591

Caribbean Irrigation Sales, Inc.
P. O. Box 107
Aguirre, P.R. 00608

The Grand Union Co.
P. O. Box 756
Hato Rey, P.R. 00919

Ochoa Fertilizer Co., Inc.
G.P.O. Box 3128
San Juan, P.R. 00936

Elanco Products Company
Box 11667
Fernández Juncos Station
San Juan, Puerto Rico 00910

Molinos de Puerto Rico, Inc.
P. O. Box
Banco Popular Center
Hato Rey

Import and Export Corp.
Carr. #21, Km. 3.6
Bo. Monacillos
P. O. Box 1196
Hato Rey, P.R. 00919

Conservas Casera, Inc.
P. O. Box 3825
San Juan, P.R.

Banco Popular
Isabela, P.R.

La Nueva Central Aguirre
Aguirre, Puerto Rico

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